

FOOD

FOR THE

TROPICS

MACKNIGHT



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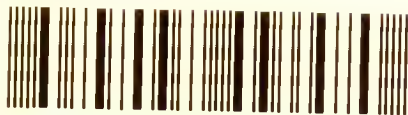
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FOOD FOR THE TROPICS

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FOOD FOR THE TROPICS

BEING A SHORT DESCRIPTION OF NATIVE
PRODUCE SUITABLE FOR FOOD IN
TROPICAL COUNTRIES

BY
T. M. MACKNIGHT

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FOOD IN THE TROPICS.

INTRODUCTION.

THIS book is intended to be an elementary comparison of European and Tropical Food. While in Europe there is a supply of good, nutritious food, in the Tropics there exists a more abundant supply.

Tropical countries include parts of North and South America, Central America, Africa, India, the Pacific Islands and the East Indian Archipelago. The Tropical Zone extends from 23° to 30° South to 23° to 30° North, thus including the line of the Equator. In those lands the rainfall is always in Summer. During the rains seeds must be planted and then they will go splendidly and ripen in the dry Winter.

By reason of the heat and moisture of the tropics, cold climate plants cannot grow there. Each zone has its own products for food and certain plants are found that grow through as much as 20° of latitude. For example, Oats and Rye are found to grow through the latitudes of 60° to 40° ; Wheat from about 50° to 25° , and Guinea Corn (Mealies, Millet) from 35° to the Equator. Thus the bread of the world is supplied.

It is most interesting to note that God has placed in all the different parts of the world food and clothing suitable



PREFACE

WHEN in Queensland, Australia, carrying on the business of a tropical produce merchant, I was much surprised to find that no reliable book could be procured giving a complete description, in a small space, of the various kinds of food, suitable for human consumption, which could be obtained in tropical countries.

I thought at first that there was a scarcity of such food, but soon came to learn that every constituent of food in the temperate zone can be obtained in one form or another in the torrid zone, and that the indigenous products of a tropical country are more suitable as food for the inhabitants than any which can be imported from another country having a totally different climate.

My object in writing this little book is to explain, to the best of my ability, the various kinds of products found in different countries, with the local names they bear, the various properties they contain, and how they can best be utilized for the purposes of food.

T. M. MACKNIGHT.

GENETO, LAGUNA, TENERIFFE,
December, 1903.

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FOOD FOR THE TROPICS

CHAPTER I

INTRODUCTION

THE tropics extend from latitude $23\frac{1}{2}$ north to $23\frac{1}{2}$ south. In this zone the rainy season occurs during the summer ; and the products mentioned in this book are suited to grow under such conditions.

Perhaps a few words in regard to the chemistry of food will be found useful. To be healthy, the human body requires certain nourishment as follows :—

| | |
|-----------|---------|
| Water, | Starch, |
| Proteids, | Sugar, |
| Fat, | Salts ; |

but proteids, starch, and fat are generally considered the most important. In European food, meat is eaten for its proteids ; potatoes, bread, etc., for the starch ; and butter for the fat : in tropical food, fish, peas, beans, etc., for proteids ; millet, manioc, yam, etc., for starch ; groundnut oil, til oil, etc., for fat (butter).

The next point is that, having gained an intelligent knowledge of the chemistry of each article of food, the *combinations* can be arranged according to the European style.

Curry and rice are somewhat similar to the European meat course. Curry does *not* mean curry powder only, but fish, or beans, etc., with vegetables, coco-nut, spices (curry-powder), etc. Rice is boiled separately, and would correspond to the potatoes or bread.

A list of books has been added in the Appendix on p. 110. These can be consulted for fuller information in regard to the local names, cultivation, etc., of some of the products mentioned in this book.

CHAPTER II

BREAD

MANIOC, maize, and the millets are very similar to bread ; but sago, unripe plantain, and breadfruit do not contain so much proteid.

Guinea Corn or Great Millet

(*Andropogon sorghum*, or *Sorghum Vulgare*, or *Holcus sorghum*)

De Candolle says this plant is a native of tropical Africa, but other authors differ on the point, as it is so universally cultivated throughout the tropics.

It is called Juar in the Hindustani language ; Sorgho (French) ; Sorgo o' Millo (Spanish) ; Durrah (North Africa and Arabia) ; Ghafouly (desert tribes and darker races of the Soudan) ; Dawa (Hausa) ; Kaffir Corn, and a variety Imphee (South Africa) ; Cholam or Soalum (Tamil) ; Jonnaloo or Jonna (Telugu) ; Mijo (Venezuela) ; Kau-liang (China) ; Michella (Abyssinia) ; Pyoung (Burmah) ; and Matama (Kisawahili and Wanyamwezi, East Africa). The grain is round, rather flat, and larger than a mustard seed.

It is the principal grain of tropical Africa, and is

extensively cultivated throughout India, West Indies, etc., growing best on black soil where it is not too swampy, as the plant rots if allowed to stand in water. At harvest time in India the heads are cut off with twelve inches of stalk attached to them, dried for two days, left in heaps for three weeks, and afterwards stacked. To separate the grain, the heads are cut off and thrashed with sticks or Palmyra Palm leaf-stalks.

The white-grained varieties are considered to be the best.

Watt says that "to the vast majority of the people of India (if Bengal be excluded) Juar and Bajra are of greater importance than wheat or rice," and Sir Walter Elliot calls it the staple dry grain of India. The Madras Presidency in 1889-90 had 4,276,509 acres of cholam (juar), and the area for the whole of India, as gathered from the Returns sent in by various Agricultural Departments, was 19,000,000 acres ; but more than this is cultivated.

The seeds are ground into meal or flour, and eaten as cakes or porridge. The "ficcory" of the Soudan is composed of the crushed seeds mixed with milk or water, and seasoned with bird peppers.

Duthie and Fuller say that the dry stalks and leaves, chopped into small pieces, form the ordinary cattle fodder for some months in the year.

Maize

(*Zea Mays*)

De Candolle says this grain is probably a native of New Granada, Columbia, etc., in South America.

The pistillate flowers are developed within the leaf-sheath at the nodes of the stem, and consist of a rachis called the "cob" with the ova on it in rows, a long thread attached to each embryo called the "silk," the whole covered by a mass of imbricated leaves folded together quite closely at the tips called the "husks." The whole organ is called the "ear." On account of the ease with which the pollen is carried by the wind, varieties which are wanted to come out true must be grown at some distance from each other.

In the United States, taking the annual average of the years 1871-81, its area was more than 52 per cent. of that devoted to cereals, and its value greater than that of all the other crops combined.

In harvesting there are two methods. First, where the corn is grown for the grain alone, it is allowed to stand untouched in the field till the grain is matured and hard; the ears are then husked from the stalks, which are left to be trodden down by cattle or ploughed into the soil. The best grain is thus obtained.

The second, or more general method, is to cut the entire mass of the crop near the ground as soon as the grain is glazed on the surface and the fodder is changed from a dark to a light green, and to set it in what are called "shocks" or "stooks," either as loose stalks or after it has been tied in bundles. When the grain is sufficiently dry to store, the ears are husked and the whole crop taken from the field.

Taking the value of both corn and fodder into account, the latter is the better method.

Porcher says that the tender green ears, stripped of leaves and then roasted by a quick fire till the grain is brown,

are a delicacy when eaten with a little salt or oil. The riper and harder grain is boiled in the leaves, and eaten with oil. The tender green grains, dried, may be kept all the year round, and used boiled (first soaking some hours in water). Ground into finer meal and boiled, it is eaten with milk or oil; or it can be mixed with water and salt, and baked into a cake.

Parched maize is prepared as follows:—Fill an iron pot with sand and set it on the fire till the sand is very hot. Two to three pounds of grain are then put in, and mixed with the sand by stirring, which causes each grain to burst and throw out a white substance of twice its size. It is then separated from the sand with a sieve, and the latter is returned to the pot to parch fresh grain. The parched maize is pounded to powder in mortars, and this, being sifted, will keep a long time.

Another authority says that the sweet variety (sugar-corn) furnishes a most palatable dish when the ears are taken green and boiled, the seeds being eaten from the cob with salt, pepper, and oil; or cut off and served in milk.

Hulled corn, a much relished dish, is prepared by taking shelled corn of a superior quality and boiling it in weak lye (made from wood ashes) until the hull or cuticle covering the grain is loosened. It is then put in cold water and the hulls rubbed off with the hands, care being taken not to break the form of the kernel, and the grain washed to remove all taste of the lye; after which it is boiled till soft, and served in milk, or with oil and sugar.

In the Southern States of America the grain is often simply ground coarsely, and after the chaff has been

removed by washing or winnowing, is called "grits,"* or "hominy."† This, when boiled, is eaten with sugar and milk, or with oil, salt, and pepper. Maize is the chief food grain of Tropical America, and is also used to an immense extent in Tropical Africa, especially on the West Coast; likewise in India.

In Venezuela the grains are soaked in water, their outer shells or hulls removed by pounding in wooden mortars, and, being subsequently winnowed, the pulpy mass (without the chaff) is then shaped into little round cakes, which are baked on hot iron plates called "budare;" these little breads are called "arepas."

The white varieties are the best for human food.

"Succotash" is the succulent ears of maize when nearly full grown, cut off, and cooked with Lima Beans. Maize flour alone is not adapted to make bread, on account of its deficiency in gluten.

Used alone, like oatmeal, it is made into a cake, and this, when roasted, is in South America called "tortilla;" and in the form of porridge with milk is called "corn lob" in British Honduras.

Hominy makes a good pudding with the usual ingredients—sugar, eggs, grated cocoanut, cinnamon, vanilla, or nutmeg, and coco-nut milk. Cold boiled hominy can be fried and eaten with peas, beans, or groundnuts.

* Grits are very finely pulverized, and have no hull.

† Hominy has no hull, and is coarsely broken up.

Bulrush Millet

(*Pennisetum typhoideum*)

A native of tropical Asia, Nubia, and Egypt ; Dr. Watt says it is indigenous to the plains of India, where the Hindustani name for it is "Bajra." It is cultivated in the same area with Guinea Corn as a rainy-season crop in North-West, Central, and South India, but more especially in Bombay (4,000,000 acres) and Madras (2,500,000 acres). It is also grown in Spanish America, where, I believe, it is called Milho Pequeno ; and on the coast of West Africa from Senegal to the Gold Coast.

It is called Gussub (Sahara, Soudan, and Bornou) ; Herneh (Nubia) ; Dokhn (Arabic) ; Gantelu, etc. (Telegu) ; Mattari (Malay) ; Kambu (Tamil) ; Matesi (Nyassaland, E. Africa) ; Gero (Somaliland, E. Africa) ; and Mansaroke (Portuguese West Africa).

Millet grows best on rather dry sandy soil, and requires perhaps less rain than Guinea Corn ; it suffers from damp and rainy weather when in flower. The cultivation is similar to Guinea Corn, and there are often fifteen hundred seeds on one spike.

For food the seeds with husks are well pounded in deep wooden mortars, and cleared of husks by repeatedly pouring sifted portions from one calabash to another at a sufficient height to enable the wind to get at it. The grain minus the husk is then returned to the mortars and beaten into soft flour, or sometimes ground to fine flour between two stones, and made into a kind of bread. Cleared of husks, pounded, and made into a paste in which a little meloheia

(the "eboo ochra" of Guinea) and oil are mixed, it forms a favourite dish called "kaddell" in West Africa. In Senegal a preparation from this grain, called "couscous," is much liked.

For forage the dry straw, and also the fresh or new leaves and stalks are used.

Ragi

(*Eleusine Coracana*)

De Candolle states that this is probably of Indian origin. It is called Ragi in Southern India; Kaynr, etc. (Tamil); Kurakkan (Singhalese); Tamideln, etc. (Telugu); Dakussa or Tocusso (Abyssinia); Talabun (Soudan, also Arabic); and Murwa or Olize (East Equatorial Africa).

The ears should be cut off when ripe, leaving the straw, and then put into heaps to sweat, in order that the grain may be loosened in the husks and easily separated.

It is said that this grain is never attacked by insects, and will therefore keep for any length of time.

The area under cultivation in the Madras Presidency is 1,551,000 acres (one acre yielding 2520 pounds of seeds), and in the Bombay Presidency 802,000 acres.

In Africa it is much cultivated in the north-eastern districts and the Soudan.

This grain is largely used as food, especially in Mysore and Southern India, where the flour is prepared in the form of puddings, or cakes fried in oil. In Ceylon it is much used in the form of porridge, and a kind of bread is also made from it.

The straw makes excellent fodder, and is said to improve by keeping. In Mysore cattle work on it alone.

Manioc, or Bitter Cassava

(*Manihot utilissima*)

This plant is widely dispersed throughout Tropical America, where it is indigenous and cultivated; it is also grown in many other tropical countries, especially Africa. Mandioca is the Brazilian name; Cassava (West Indies and certain parts of Africa); Yuca Amarga (Venezuela); Mangahazo (Madagascar); Maracheenie (Malay); Maravullie (Tamil); Mangyokka (Ceylon); Mohogo (Wanyamwezi, East Africa); and Juca or Yucca (Peru and Hayti).

It is generally known as the Bitter Mandioca, but in Brazil is simply called Mandioca, being the chief kind cultivated. Peckolt describes twenty-one varieties. In Cayenne the varieties are Maie, Cachiri, Bois Blanc, and Mai-pourri-rouge.

It is a large half-shrubby plant with very large roots, which weigh sometimes as much as twenty pounds; three to eight plants grow in a cluster. The leaves are near the extremities of the branches, being large and deeply seven-parted.

In South America the roots are taken up in from nine to twelve months, or as required; they are then well washed, and the skin being scraped off, are grated or rasped; the pulp is then pressed to get the juice out, dried on hot metal plates, and pounded into meal, which is called "farinha." The pressure and heat are for the purpose of

removing the poisonous principle contained in the juice. The meal, if well dried, will keep for a year. The root in the green state does not keep good for long, but will do so if sliced and dried in the sun.

Bammy cake is the name of a thick kind of cassava cake, made in Jamaica. These cakes are made by gently heating the meal on a flat, broad, round iron, called a baking-stone, and then drying in the sun. They are eaten daily in Tropical America, and, if cooked till they are brown, will keep sweet and wholesome many months.

The Bitter Mandioca does not become soft by boiling.

The poisonous principle is hydrocyanic acid (prussic acid), and the highest quantity found in any variety is 0.0760 per cent. Hydrocyanic acid is very soluble in water, and very volatile.

Casareep, or cassiripe, a sauce or condiment made from the juice, is in the highest esteem in Guiana, South America, where it is employed to flavour almost every dish, and is the basis of the favourite West Indian dish called "pepperpot." Pepperpot consists of casareep with peppers (chillies), and fish. Casareep is made by evaporating and concentrating the Bitter Mandioca juice, and combining with it various spices. The poisonous principle of the juice is dissipated in the evaporation, so that although the juice in the fresh state is readily fatal to life, the sauce is perfectly safe and wholesome. It is also a powerful antiseptic, and meat can by means of it be kept quite fresh for a long time, even in a tropical climate.

Rice

(*Oryza sativa*)

Rice is extensively cultivated in India, China, the West Indies, and Central America. More than one hundred varieties are grown in India and Ceylon alone.

Paddy is the name given to the seed when enclosed in the husk ; and, as the husk adheres very closely, care must be exercised to enable its removal to be effected without damaging the grain. After the husk has been removed, the grain is passed through a whitening machine, which removes the inner cuticle or red skin, and the product forms the rice met with in the shops.

In some places paddy is prepared as follows : The paddy is placed in large wooden boxes, and beaten with wooden pestles a yard or more long, to separate the husk from the white grain within ; it is then scooped out into a shallow tray of closely woven ratten work, of circular form, and about two feet in diameter, in which it is sifted by being thrown up in the air so that the chaff is blown away, the grain falling back into the tray. When finished the grains are perfectly clean and white.

Rice is used for making into puddings, cakes, and bread ; and, when cooked, each grain should be separate, yet soft to the heart. When boiling, only use enough water to cover it ; simmer on a slow fire, taking out the water by degrees with a spoon so that the grain may be dry, and remove from the fire when just short of burning.

Sago

(*Metroxylon sago*)

A native of the Moluccas, Sumatra, Bornco, New Guinea, Celebes, etc. It is called Sagu-dana, or Sagu Chawul in Hindustani; Sagu (Malay); Sikumi (Chinese); and Ranbaya (Molucca). The sago palm is a low and thick-set tree, and flourishes in low marshy situations.

When about fifteen years old it is ready for yielding, the whole interior of the stem being full of spongy matter, around which is a rind of hard wood. Should the tree flower and the fruit ripen, all this is absorbed, and the tree dies. Before this occurs the trees are cut down, the stem cut into lengths, split up, and the pith extracted and grated to powder.

This powder is then kneaded with water and strained, the sago passing through the strainer and the woody fibre remaining behind. The starchy fluid is then floated into troughs, and the sago settles at the bottom. After one or two washings, it is considered fit for domestic purposes.

Sago intended for domestic use is made into biscuits, which, if kept dry, may be preserved a very long time. It is also dried and made into sago meal, from which a variety of dishes can be made. Sago is caten with beans, peas, groundnut, etc.

In the East Indian Archipelago, the islands to the west use rice, but to the east sago takes its place.

Breadfruit

(*Artocarpus incisa*)

Probably a native of Java, Amboyna, and the neighbouring islands. In Venezuela it is called Arbol de Pán ; Sookoon (Malacca and Sumatra) ; Fruteira de Pao (Brazil) ; Soccus, or Soccum Capas (Malay) ; Soccum (Java) ; Rina (Ladrone Islands) ; Po-lo-mih (China) ; and Reina (French). In Singapore the fruit with the rough rind is called Keluway, but with the smooth rind Sookoon.

It is propagated by means of suckers from the root, of which there are an abundance.

There are thirteen varieties, but Dina Buco and Balekana are the best.

In Fiji the two most common varieties are Uto-dina and Uto-buco. The name Uto-dina (True or Genuine Breadfruit) is probably given because of the good quality of the fruit, which is said to be undisputed. It has pinnatisect leaves with smooth surface ; fruit without seeds, nearly spherical, with smooth surface ; and stalks four to five inches in length. Uto-buco has leaves similar to the last, with fruit ovate obtuse, larger than others, without seeds, and smooth surface when ripe. Uto-sore is the only variety which yields ripe seeds, leading one to suppose that it is the parent of all the others. If a good fruiting variety is required, take suckers or cuttings from the roots of Uto-dina. The more flat and smooth the warts on the outer surface of the fruit, the greater the quantity of pith it will contain. *Sore* means a seed.

Breadfruit is roasted, boiled, steamed, or cooked on hot

embers, and kept turning for fifteen to twenty minutes, the skin being scraped off very gently. In Amboyna it is roasted on coals till the rind is burnt, then peeled, and the kernel cut into pieces and eaten with coco-nut milk. Others make fritters of it. In Sumatra it is cut in slices and boiled; or fried and eaten with sugar; or the soft internal part is dried in slices, and used when required; thus prepared it will keep a long time. When the breadfruit is peeled and mashed it can be made into a pudding with sugar, eggs, oil, nutmeg, or cinnamon.

In Kew Gardens Museum, London, breadfruit biscuits from Jamaica are shown, being pieces of the fruit sliced and sun-dried.

The leaves make excellent fodder for cattle; they are also used for the roofs of native dwelling-places.

Sagot, in "Cultures Tropicales," states that the best varieties (which are seedless) are Rare and Pueru. These are probably Tahitian names.

Plantain

(*Musa sapientum*, var. *paradisiaca*)

A native of Continental and Insular India, etc. It is called Plantain en Arbre, or Platanier (French); Pisang (Straits Settlements); Platano Arton (Peru, Mexico, and New Granada); Katch Kêla (Hindustani and Bengali); Anawalu-kesel (Singhalese); Zapala (Mexico); Ah-kawndaw (Mpongwe and Benga dialect of Bantu, West Africa); and Platano Turco (Bolivia).

The fruit is longer and larger than the Banana.

The following are the best varieties grown in the different countries of the tropical world :—

INDIA

In Madras, a large plantain known in the Tamil language as Monthen, is one of the commonest. In Bengal the Katch Kulla (the cooking plantain of the Europeans) of a large size ; and Firminger states that the most extensively cultivated is the Kuntela, also the Mahl-Chog or Mohun-Chog, in quality like the Kuntela. In Arracan, the Hnet-pyan-meng is very large.

INDIAN ARCHIPELAGO

Musa corniculata, a native of the Malay Islands and Cochin China (called Chuoi Boi in Cochin China), is very good ; also Pisang Abu, Pisang Soldado, and Pisang Alphuru.

Pisang Tandok, a very large horned variety, common in Borneo, etc. ; it is one foot in length and two inches in diameter.

AFRICA

On Lake Tanganyika there is a variety called Mikous t'hembu. Stanley (in "Darkest Africa," vol. i., p. 252) saw plantains twenty-two inches long beyond Yanbuya, and again at Bokokoro some seventeen and one-half inches in length ; and (in vol. ii., p. 55) abnormally large plantains were found at Andata and Andikamu.

BRITISH GUIANA

The White Plantain is the kind chiefly grown in British Guiana, where it is regarded as a necessary article of food, while the banana is considered an added luxury.

JAMAICA

The Horse Plantain is the variety ordinarily grown and has generally twenty on a bunch.

TRINIDAD

The Horn Plantain (thus called because the fruit is like the horn of a young bull) is the most extensively cultivated, and has generally twenty-five on a bunch. The fruit is turned upwards, being characteristic of this species of plantain.

BRAZIL

The best varieties are the Mosquito, Massa, Preta, and Davoa.

Dampier says the plantain is usually cooked when just full-grown, but before it is quite ripe or has turned yellow. Green plantains peeled, sliced thin, dried in the sun and grated, will make a good meal for puddings, etc. Boiled, they are suitable to eat with meat instead of potatoes.

A true plantain is always *cooked* before being used at the table.

The Darien Indians preserve them a long time by drying

gently over the fire, mashing them into a pulp, and then moulding into lumps. In Fiji the grated plantain is made into a pudding with coco-nut milk, sugar, and grated coco-nut. In Cuba it is cooked in slices with oil.

In the Albert Nyanza District, East Africa, plantains, when peeled, are cut into thin slices, dried in the sun till crisp, then stored in granaries till required.

In India, plantain meal is obtained by peeling the fruit, slicing, drying in the sun till crisp, and then grinding. This meal is called "conquintay" in the West Indies and British Guiana, where it is highly esteemed and extensively used.

Some say that, after removing the skin, the slightly mealy thin layer on the outer surface should be scraped off before use, as it is somewhat bitter.

It would be a good plan to confine the name "Plantain" to the large variety which is always gathered and *cooked* while green, and "Banana" to the product which is allowed to ripen before use.

In Mexico, Humboldt calculated that one acre planted with plantains was sufficient to support fifty men, whilst the same area in wheat would barely support the wants of three.

CHAPTER III

POTATO

ALL the following articles of food are somewhat similar to the potato, with the exception of the Sweet Potato, which contains a varying amount of sugar.

Yam

(*Dioscorea*)

It is called Inhame (Spanish and Portuguese); Ighame (French); Ovy (Madagascar); Ajes (Cuba); Cara (Brazil); Cambares (Island of Bourbon); and Namain (Carib).

The six most important varieties are as follows :—

Dioscorea alata.—The Wing-stalked Yam, a native of India and the South Sea Islands. It is called Uvi, or Ubi, in the Islands of the South Pacific, Java, etc.; Kham-alu, or Kham (Hindustani and Bengali); Ima (Ternate); Lami (Macassar); Heli (Amboyna); Lutu (Banda); Khoai-tia, etc. (Cochin-China); Perum-vullie-kalangu (Tamil); Gudi-midonda-pendalam, etc. (Telegu); and Perinvullie-kelunghu (Malay).

This tuber is sometimes 8 feet in length, and weighs

up to 80 lbs. The stems are four-angled, with wide-spreading wings along the margins. This is generally considered the best variety, and if well dried in the sun, covered with ashes or sand, or put in casks, it will keep for many months.

Dioscorea globosa.—Called Chupri-alu in the Hindustani and Bengali languages.

Dioscorea aculeata.—The Prickly-stemmed Yam ; Manalu (Hindustani) ; Kawai (Fiji) ; Afou, or Yellow, or Guinea Yam (West Indies) ; Cará de Guinée (Brazil). The stem is round, and requires no support or trellis-work. It is the smallest and the most delicately flavoured variety, ripening later than the Wing-stalked Yam, and is generally rather sweet ; when cooked, the skin peels off easily. This tuber will keep for nearly a year, and Seeman says it is one of the finest esculents on the earth.

Dioscorea atropurpurea.—Dark Purple Yam, or Malacca Yam ; Myouk-ny (Burmah) ; and sometimes sold in Calcutta as Rangoon Yam.

The tubers are, like the stems, of a deep purple colour. The leaf-stalks are winged, and the stem grasps its support. It is extensively cultivated in Pegu, Malacca, and the Eastern Islands. This variety is considered the third best yam in India.

Dioscorea batatas.—Extensively cultivated in China, where it is called Sain.

Dioscorea sativa.—Called Cará in Brazil ; Ratalu (Hindustani) ; Shu-yu (China). This is the common yam, and has a round stem with heart-shaped leaves. It is a climbing plant, and is cultivated in the East Indian Archipelago and by the Santals in Chutia-Nagpur, India, etc. In Bombay

it is the most extensively grown species. The root is flat, palmated, one foot in breadth, and externally dark brown, and will keep good several months; the skin, however, is tender, and, if broken, soon begins to rot.

Yams are either roasted or baked, and treated like an English potato. Firminger suggests that, if they are boiled, they should be buried for half an hour beneath the hot wood ashes, and the moisture dried out of them. In Africa and the West Indies the yams are often sliced and dried in the sun, in order to make them keep a long time. Specimens of these may be seen in Kew Gardens Museum, London, under the name of Affoo yam biscuits, Negro yam biscuits, and White yam biscuits.

Taro

(*Colocasia antiquorum*, var. *esculenta*)

The above is the South Pacific name. In the West Indies it is called Coco, and sometimes Eddoes; Kolkas (Egyptian and Arabic); Kachu, etc. (Hindustani); Shamak-kizhangu, etc. (Tamil); Shama-thumpa, etc. (Teglegu); Chempakizhanna, etc. (Malay); Ma-hu-ya-pein (Burmah); Saonjo (Madagascar); Koko (West Africa); Ocumo (Venezuela); Tania (Liberia, West Africa); Myoogwah (Uganda and Unyoro, East Africa); Malombo, or Msaru (German East Africa); Inhanu (Highlands of Brazil); and Caymon (Cochin-China). It is native from Egypt to South Asia, and in the South Sea Islands, also the warm parts of East Australia. As an article of food it is largely cultivated,

being deprived by roasting or boiling of the characteristic acidity of the botanical order to which it belongs.

In Fiji it is called Dalo ; and the varieties cultivated there are Bassaga, Bega, Dalo ni Vanua, Karakarawa, Keri, Kurilagi, Munin, Kuiawa, Sika Viloa, Sisiwa, Soki, Toakula.

When taken out of the ground it can be kept fresh and fit to eat for little more than a week.

Some varieties are used for puddings, some for bread or simply for boiling or baking, and are distinguished by the different tinge (white, yellow, or purple) of the leaves, stalks, and ribs of the leaves.

Taro is sometimes parboiled, and then roasted. In the Sandwich Islands a sort of paste, called Poi, is made from it, and much used as food when boiled or fried. Paiai (hard or dry Poi) is taro baked and beaten on a piece of wood with a stone without being moistened with water ; then packed in small bundles and bound in ti leaves, when it will keep for months, and is the principal sea-store of the Sandwich Islands vessels. "Soft poi" is taro baked, then moistened with water, and beaten with a stone upon a piece of wood, allowed to ferment, and then eaten.

The young leaves are used as spinach, but, like the root, they require to be well cooked.

Sweet Potato

(*Batata edulis*, or *Ipomœa batatas*)

A native of tropical South America, but cultivated in all tropical and sub-tropical countries for its root. It is called Batata in Venezuela ; Mita alu (Hindustani) ;

Vallikilangu (Tamil); Chelagada (Telegu); Kapa-kalenga (Malay); Kaz-wan, etc. (Burmah); Batata Doce (Brazil); Patati (Peru); and Camote (Mexico). In Malacca one variety is called Oobi Tora. In Haussaland, West Africa, it is called Dankali. In India there are apparently two varieties, one with purple (or red) root, called Sakarkanda, another variety with a white root, called Chia-e-alu. In Brazil there are five varieties, of which Batata Roxa is one of the best, and Batata Amarella, or Gerimu, is very sweet. It can be kept in the ground from one year to the other.

It can be boiled, cut in slices, with milk, sugar, and grated coco-nut added, making a good dessert; or boiled, mashed, and made into a pudding with sugar, eggs, grated coco-nut, and some kind of spice, as nutmeg or cinnamon. Sometimes it is roasted whole in hot ashes, or cut in slices and fried in oil. Perhaps the best way is to peel and grate when raw, and then make into a pudding as above, this being the Brazilian way. In Siam and the East Indies it is often preserved as a sweetmeat in clear syrup.

Sweet Cassava

(*Manihot aipi*)

In Brazil it is called Aypim, Mandioca Doce, or Sweet Juca. It is a native of tropical America, and is described as having the leaves five-parted, and the root longer than the bitter variety. Fawcett says that the root is reddish, and Barham says that the plant bears a large berry.

In Venezuela, South America, it is called Yuca Dulce; Mhogo (Kisuaheli, East Africa); and Aipi (French Guiana).

Cassava must go straight from the garden to the pot, if possible, the same morning, as the day after it is dug up it becomes hard and unfit for food. It can be grated and exposed to the sun, or dried on heated plates, when it will keep for almost an unlimited time. It has a non-poisonous juice, and tough portions in the centre ; but becomes quite soft by boiling. It is also eaten roasted, but is not nearly so much used as the Bitter Mandioca.

The green tops are excellent fodder for cattle, and the stems for firewood.

CHAPTER IV

MEAT

It is very difficult to get good fresh meat in the tropics, but in mountainous country, higher than 3000 to 4000 feet above sea-level, it can often be obtained; even in these cooler altitudes it is never very enticing.

A good substitute is found in fish, turtle, beans, and peas, etc. These all have more proteids than meat, and the groundnut has much butter in addition. The natives of India are much in advance of Europeans in the preparation of pulse. It is prepared like split peas; or ground into flour, then mixed with some liquid into a paste, and made ultimately into solid balls which can be grated into a powder as required. All this facilitates the cooking, and is eminently suited for easy digestion.

Lima Bean

(*Phaseolus lunatus*)

A native of tropical America. In the West Indies it is called Sugar or Hibbert Bean; Duffin Bean (India); Bunburbutti (Bengali); Kursumbulle Pullie (Hindustani); Kabarou by the Sakalaves in the south of Madagascar; Unverango or Btuma (Wanyoro, East Africa); Dau-dai (Cochin-China); and Kajang-koakara (Java).

The pod is from two to three inches in length, and scimitar-shaped.

The best variety is the large, oval, white-seeded kind, with, at most, a brown or black mark close to the hilum, being preferable to the flattened reniform kind with blotches of red or black veinings.

The large flat, ivory-like, young green beans (seeds) are shelled, and boiled for about two hours, until quite soft. They are then exceedingly agreeable, and have a mealy, roast-chestnut-like flavour. When old, soak in water overnight, simmer for three hours, pour off the water, and add some milk, oil, spice, and salt.

In some parts of China the beans are ground to a coarse powder, mixed with a little water, then pressed into masses like cheese, and cooked as required after being finely grated.

Caraotas negras are a staple article of food in Venezuela, and "feijao" is the national dish of Brazil.

Green Gram

(*Phaseolus mung*)

A native of India. In the Hindustani language it is called Mung, and sometimes Green Gram; Dochirokko (Kisuah, East Africa); Posue (Kichamb, East Africa); Bokwa (Bongo, East Africa); Ntoyo (Wanyoro, East Africa); Lentejas (Venezuela); Munge (Arabic); Dau-muong-an, etc. (Cochin-China); Siru-payaru (Tamil); Wuthulu (Telegu); and Pai-nouk, etc. (Burmah).

Mung has dark green leaves, and much smaller and shorter seeds than Urd (see next page). There are three varieties with green, yellow, or black seeds, viz. green-seeded

(Harri Mung), the typical and common variety ; yellow-seeded (Sona Mung) ; black-seeded (Max Mung). These varieties are found in India.

The ripe seeds are boiled whole, or split like peas. They are also parched and ground into flour, which is made into balls with spice, or employed for making porridge. The beans are sometimes eaten parched, or boiled with condiments.

The beans (seeds) keep well.

The crushed stalks and leaves are much prized for fodder.

Black Gram

(*Phaseolus mung*, var. *radiatus*)

A native of India. The leaves are yellowish green and the whole plant has greater hairiness, a more trailing habit, seeds fewer, larger, longer, darker brown colour than the Mung Bean. There are two varieties—the large black-seeded kind, and smaller green-seeded variety. It is the most highly prized of the genus *Phaseolus*, and is largely cultivated throughout India. It is called Dau-xanh, etc., in Cochin-China ; Urd, etc. (Hindustani) ; Patchey-pyre (Tamil) ; Minumulu (Telugu) ; and Cheru-poiar (Malay).

It thrives in heavier soils than the Mung Bean, and is sown at the beginning of the rainy season. In Madras it is cultivated on dry lands, being sown in August or September.

The ripe beans (seeds) are the most esteemed pulse in India, and fetch the highest price. It is eaten like mung, boiled whole ; parched ; or as spice balls, and is the chief constituent of the Water Biscuits known in Bombay as “papad.” In the Punjab “bari” and “sepa” are prepared

by soaking the beans for two days in slightly warm water, then crushed to pulp by a stone and dried, and eaten mixed with oil.

The straw is highly esteemed as fodder.

Moth Bean

(*Phaseolus aconitifolius*)

A native of India, and prefers dry, light, sandy soil, being sown in June or July. Moth (Hindustani); Tulkapyre (Tamil); and Kuncuma-pesalu, etc. (Telegu). It is an important crop in Satara, Ahmadabad, Poona, Kaira Sholapur, and Dharwar in the Bombay Presidency.

It is ground into flour, and used with other grains in making cakes.

The whole plant is valuable for fodder.

Cajan Pea or Red Gram

(*Cajanus Indicus*)

In the West Indies the small variety is called No Eye Pea, and the large, Congo Pea; Toovar (Hindustani); Thovaray, etc. (Tamil); Kandalu (Telegu); Pois d'Angole Pois Cajongi, or Ambre Vade (F. Guiana); Large Dhall (India); Ambarivattray (Madagascar); Pai-yenkhy-ung (Burmah); Shaz (Malay); Baraz (Unyoro East Africa); Thur (Zanziba); Mbalasi (Kisuah, East Africa); and Kadjan (Arabic). A light moist soil is required.

The leaves and pods are stripped off the stems, then heaped together and the grain threshed out. It is much used, and is either parched in hot sand and eaten dry, or with oil and salt, or ground into flour and made into cakes.

Soy Bean

(*Glycine hispida*, or *Soja Hispida*)

This Bean is called Hwang-ta-tau, etc. (China); Daunanh, etc. (Cochin-China; Shōyu (Japan); Kachang-kadele-putik (Borneo); and Bhat, etc. (Hindustani). It is a native of Cochin-China, Japan, and Java.

There are two varieties—White, and Black. So far as is known it is not attacked by insects.

Professor Kinch states that, as a nitrogenous food, it excels all others. In Japan the white variety is used for making tofu, or bean cheese by grinding into flour, adding some liquid, and pressing. The black variety is eaten boiled with rice. In Northern India it is rasped or ground into “satu” or simply roasted as “ata;” also eaten when split like peas. One kind contains almost 20 per cent. of oil, and is called Tau-yu (China), which is extracted and extensively used as butter in China and Japan. The beans are used to make a kind of soup in Japan called “miso,” or boiled with fish and vegetables. They are boiled either green or ripe, and, in the latter state, should be soaked twelve hours in water containing a little salt. A sauce, called Tsing-yu in China and Soya in Japan, is also made from them. Ten-hu is the name of Bean cheese in China.

The straw surpasses in nitrogenous value that of wheat and even hay.

Catíang Bean

(*Vigna Catíang*)

This Bean is called Lobia, or Chowli, etc. (Hindustani); Caramunny-pyrc (Tamil); Boberlu, etc. (Telugu);

Adoug-gouari (Abyssinia); Kachang-perut-ayam (Malay); and Lubia (Arabic). It is universally cultivated throughout the tropics, but is less valuable than the Urd or Mung Bean.

The seeds are sown at the commencement of the rains.

The beans (seeds) are split like peas, or ground into flour. The variety with white seeds (beans) is the best.

The leaves, stalks, and stems are used as fodder.

Groundnut

(*Arachis hypogæa*).

A native of Peru and Brazil. It is called Mung-phali, etc. (Hindustani); Verk-kadalai, etc. (Tamil); Verushanagakaya, etc. (Telegu); Mibe, etc. (Burmah); Mani (Peru and Venezuela); Mendubim (Brazil); Myaebai (Burmah); Loh-hwa-sang (China); Kachang-tanah (Malay); Pistache de Terre (French Guiana); Njugu Nyassa, or Njugu Mawe (Swahili); and, in the West Indies, Pindar. Being universally cultivated in the tropics, it has various local names. The pods, though at first formed above ground, are, as they increase in size, forced into the earth by a natural motion of their stalks, and come to maturity three to four inches under the surface. Hence the popular name of Ground or Earth Nut.

They are usually roasted. In West Africa they are made into soup (after being roasted), with vegetables (egg plant, etc.), and condiments. A very good oil or butter is extracted from the nut, having chemical constituents similar to butter, and called "katchung" oil in India, "hwa-sang-yu" in China. Where a mill for the expression of the

oil is not accessible, the seeds can be shelled out, pounded, and boiled in water, the oil, as it rises to the surface, being skimmed off. This oil will keep for a long time without becoming rancid.

The leaves and branches form a nutritious fodder.

Turtle

The flesh of the Green Turtle is eaten in all tropical countries. The two most choice preparations in the West Indies are soup, and boucan. The soup is seasoned with capsicums, ginger, cloves, and nutmeg. The boucan is the shell of the belly, on which is left three to four inches of flesh with all the fat, and this fat is green and of a very delicate flavour. After being seasoned with lime juice, cayenne pepper, salt, and cloves beaten up, the boucan is placed in the oven, which must not be too hot, as the flesh of the turtle is tender, and should be cooked slowly. While it is baking the flesh should be pierced from time to time with a wooden skewer, so that the gravy may penetrate into every part. It is sent to the table in the shell, and the meat carved out of it. The flesh is also salted in some countries. In Honduras and Jamaica the flesh is cut off in strips, and dried in the sun. It then requires three to four days soaking in water before it can be made into soup, but this process of drying and softening does not spoil it in any way. Turtle is easily digested.

The eggs of all marine turtles are edible ; but the white, or albuminous part, does not become firm in cooking. The eggs are deposited in the springtime on the higher sands on the beach, and slightly covered up.

In parts of India the eggs are salted, and keep fresh from three to five years. For salting, the fresh egg is well shaken, causing the white part and the yolk to blend together. It is then rolled by hand on a board with salt, until the whole shell shows a marked difference in appearance. It is then packed in fine salt.

In the East Indian Archipelago the eggs of the Pinnio (sea turtle) and of the Tootong (river turtle) are much esteemed. The eggs of the river tortoise of Africa have an excellent taste.

On the Orinoco and Amazon Rivers in South America, a good, clear, sweet oil is obtained from them.

Fish

Until quite recently a popular belief has existed that fish consisted very largely of phosphorus, and consequently acted as a food and stimulus for the brain. Careful analysis has proved, however, that this theory is erroneous; phosphorus is only present in most minute quantities, what there is being included in the mineral salts, of which the percentage is only 1·2 (see Table on p. 108).

As an article of food, however, the result of the analyses of different species of fish goes to show that it is equal in value to beef, and contains the same nutritive substances.

Some kinds of fish, however, contain a larger quantity of fat—the shad, for example, having 9·5 per cent., while the king fish has hardly any at all.

Fish is extensively used as food in tropical countries. (See Appendix III. for list of Tropical Fishes.)

CHAPTER V

BUTTER

SOME of the tropical butters keep good for a considerable time ; for example, Shea Butter, Beni Oil, etc., and all contain oil or fat similar in chemical constituents to European butter made from cows' milk.

Til or Beni Oil

(*Sesamum indicum*)

A native of South Asia, and east to Japan. It is universally cultivated throughout tropical countries, and is called Beni in West Africa ; Karra (Bagirmi, West Africa) ; Mbellemoh (Monbuttoo, Equatorial Africa) ; Ufuta (Kisuah, East Africa) ; Sem-sem (Egypt) ; Hnan, (Burmah) ; Nuvvulu (Tamil) ; Nuvvu, etc. (Telugu) ; Schit-elu, etc. (Malay) ; Til, etc. (Hindustani) ; Gingelli (Malabar) ; Widjin (Malay) ; Benjan (Sumatra) ; Lenga (Java) ; Ku-shing-tsze or Moa, etc. (China) ; Oil Pulse, (West Indies) ; Sim-sim (East Africa, and also Arabic) ; Ajonjoli (South America, especially Venezuela) ; Wanglo (Demerara) ; Wangala (British Guiana), and Angada (Abyssinia).

The two chief varieties are black, and white. In Bengal the black variety is the more common, yielding a superior oil. Moloney states that in West Africa, when the crop is ripe it is cut and stacked for seven days, then sun-dried for three days. This causes the pod to burst and liberate the seeds. The removal of the seed is effected by shaking the stalks, when half the seeds will drop from the pods ; the stalks are allowed to dry two days longer, when the remaining seeds are removed in the same way. The seeds, after removal, are washed in cold water several times, then exposed to the sun to bleach, and the oil finally extracted by pressure. Nine pounds of seed yields two quarts of oil. In East Africa the seeds are dried and pounded in large mortars, and, when the oil begins to appear, a little hot water is poured in, and the mass forcibly squeezed between huge pestles. All that floats is then ladled out into pots and gourds. The oil, thus obtained, will keep for many years without becoming rancid, either in taste or smell.

The seeds are often parched, ground into meal, and made into cakes. This flour is sometimes mixed with jaggery for making sweet cakes. In Demarara they are parched, ground, and made into a rich soup.

Palm Butter

(*Elæis guineensis*)

This palm is distributed generally over tropical West Africa, from the coast to four hundred miles inland. It is

said to grow at Zanzibar, Pemba, and on the shores of Lake Tanganyika. It is called Mchikichi in the Swahili language, Mtschikitschi (Kisuah, East Africa), and Mchikichi (Lake Tanganyika, Africa). It has a well-developed fruit spike, and sometimes five hundred fruits are found upon one tree, each fruit being about the size of a large olive.

The oil from the pulp is very largely used as food. The pulp contains 72 per cent. of oil (palm butter); which is used in the same way as Europeans use butter. The palm oil used for human food is prepared as follows. The nut bunches are kept in a warm place for three or four days and the nuts then taken out. Three to four pounds are made at a time. They are boiled in iron pots, and then put into wooden mortars and pounded with wooden pestles. The pulpy mass is then mixed with tepid water, the chaff removed, and afterwards the stones, the oil remaining mixed with the water which is passed through a sieve. It is then put into a pot placed on the fire, heated to boiling point, and allowed to continue in that state while the oil floats up as a bright red substance and is skimmed off. The oil is now put into a pot, and heated, to drive out any water it may contain.

The main nerves of the exterior of the pinnae of the leaves and the exterior of the leafstalks are used for making baskets and brooms. At St. Paul de Loango the fibre at the base of the leaves, and also that of the spathe, is used for stuffing cushions, etc.

The soft centre at the upper part of the stem, consisting of undeveloped leafstalks, is much relished as a vegetable.

Shea Butter

(*Butyrospermum Parkii*)

It is called in West Africa, Galam, or Bambouk Butter Tree ; or Kadanya ; Toso (Fulfulde) : Karehi (Fulbe) ; Kadena (Hausa) ; and Ce (Senegal) ; Kunuri (Bari tribe of Equatorial Africa) ; Lulu (Arabic) ; and Mipampa (Lake Regions of East Africa). Found chiefly on the mountains of tropical West Africa and Nileland ; but especially abundant in the Niger country, Nileland, Niam Niam country, Madi, Borneo, and Gaboon.

When the land is cleared this tree is always left standing. The butter, which is solid, is obtained from the kernel by drying the stone in the sun after the pulp is removed. The kernel is bruised in the usual way in the mortar, boiled, and as the butter comes to the surface it is skimmed off. This butter, Mungo Park states, is whiter, firmer, has a richer flavour than cows' butter, and keeps a whole year without salt. Henderson says that of all the fats with which he is acquainted this seems to remain the longest unaltered.

Juvia Butter

(*Bertholletia excelsa*)

A native of Brazil on the Orinoco and Amazon Rivers ; especially abundant at Topaiunquara. It is called Castanheiro-do-Para, and in Guiana is known as Tuka.

The nuts are at first enclosed in an outer woody shell as

large as a moderate-sized melon ; each shell contains about twenty nuts averaging $1\frac{1}{2}$ inches in length, and which are thick, and triangular in the middle, but sharp at each end.

The oil or butter is secured in the usual manner by subjecting the kernel to pressure. The kernel contains 65 per cent. of oil, which is greatly esteemed for culinary purposes. Each pound of kernels yields 9 ounces of oil.

Patawa Oil

(*Ænocarpus Batawa*)

It is called Patavoua in French Guiana ; and Seje (Venezuela). It is a native of tropical America, especially abundant in Cassiquare alto, Orinoco, and Cnuncunuma, opposite San Carlos from Rio Negro to the Xie in Brazil, etc. Spruce says he was "passionately fond of the fruit, which is in season nearly all the year round." The leaves can be used as a thatch.

The pulp and the kernel yield equally good oils for food. This oil is excellent, being colourless, sweet, good for cooking and all purposes of food in the same way as butter. The oil is obtained from the fruit in the usual way.

Coco-nut

(*Cocos nucifera*)

De Candolle says that its habitat is most probably the East Indian Archipelago, but it is commonly cultivated in all tropical countries. There are three varieties cultivated

in India and Ceylon : the King, which is very good ; the Dwarf, much sought after in Ceylon for gardens ; the Brahmin, with large nuts, principally esteemed for its milk.

The oil is used as food, and must be eaten soon after its extraction as it quickly decomposes. It is obtained in the usual way by expression, or boiling and skimming. The kernel is often preserved in sugar and made into various sweetmeats. When "young" the kernel is a delicious food, being easily separated from the shell with a spoon, and when ripe is grated and added to puddings, etc.

The *young* coco-nut has a large cavity in the centre of the kernel containing the liquid commonly called "milk," which is considered very refreshing and nourishing, and is used as a substitute for water. It is often substituted for cows' milk in the preparation of puddings.

The white outer part of the kernel is, when dried, known as "copra." In India, copra is eaten with parched rice ; or rasped and put into curries ; or made into sweetmeats. The grated kernel produces a sweet milk, used instead of cows' milk in cookery.

The other products of the palm are "sugar" and "vinegar," which are obtained in the following manner. When the spathe is about 2 feet long and 3 inches thick it is tightly bound with strips of young leaves to prevent expansion, and the point cut off transversely to the extent of one inch. The cut end of the spathe is gently hammered in order to crush the flowers thereby exposed, and to determine the sap to the wounded part. The stump is then bound up with a broad strip of fibre. This process is repeated morning and evening for several days, a thin layer being shaved off on each occasion and the spathe trained to

bend downward. This operation is continued from five to fifteen days. The dropping of juice will show that it is ready to yield toddy.* The end of the spathe is then fixed into an earthen vessel, to catch the oozing liquor. A single spathe will continue to yield toddy for about a month, during which time the trec is climbed twice a day and the juice collected. The process of binding and cutting the spathe an inch lower down is repeated each time the juice is collected. Three to four quarts is the average quantity obtained in twenty-four hours, and the tree continues to yield from six months to a year. Sometimes this fluid is converted into what is called "nira," by lime-washing the collecting vessels in order to prevent fermentation, and then sold as a sweet and refreshing drink.

When the juice is intended to be made into "jaggery" (sugar), the earthenware vessels in which it is caught are powdered with lime in order to prevent fermentation, and the time of collecting is early in the morning. Jaggery is prepared in the usual manner, by boiling down and evaporation.. Eight gallons of juice boiled over a slow fire yield two gallons of jaggery, which, when dried, is tied up in small quantities in dried plantain leaves, and kept for sale. This sugar has a delicious nutty flavour and fragrance as unique as maple sugar. Melt this sugar, pour on grated ripe coco-nut, and a delicious sweetmeat is produced.

A recent report issued by the Revenue and Agricultural Department of India states that in Madras there were 24,900 acres of Palmyra Palm, 5,700 acres of Coco-nut Palm, 1,600 acres of Date Sugar Palm ; and the writer of that

* Unfermented juice.

report adds, "In 1884-5 and 1885-6 the total quantity of jaggery produced from these palms is apparently more than that from the sugar cane."

Self-fermented toddy is extensively used by bakers in India, in place of yeast.

Royle states that "vinegar" may be produced from the juice by allowing it to undergo the acetous fermentation, and for this purpose a supply of juice is procured in the morning and evening, particular care being taken that the vessels employed have been well cleaned and dried.

Dickens, in *Household Words*, says that "when the Singhalese (Ceylon) villager fells one of these trees after it has ceased bearing, with its trunk he builds his hut and bullock stall, which he thatches with its leaves. Slips of the bark are used for bolts and bars, and the plot of chillies (peppers), and grain is fenced with its leafstalks. The infant sleeps in a net of coir string from the husks. The meal of rice and grated coco-nut boiled over a fire of coco-nut shells and husks, is eaten out of a dish formed of the plaited green leaves with a spoon cut out of the nut shell. His torch is composed of a bundle of the dried leaves and flower-stalks, fishing nets of the fibres, and the canoe is the trunk of the tree. He drinks the fresh milk of the nut, eats the soft kernel, drinks toddy (unfermented juice), flavours his curry with its vinegar, sweetens his coffee with its jaggery (sugar), and softens it with the milk. The wood forms the doors, windows, shelves, chairs, and the water-gutter under the eaves. Spoons, basins, mugs, salt-cellar, and jars are made from the shell."

Dika Almond

(*Irvingia Barteri*)

It is called Wild Mango at Sierra Leone ; also Udika, Oba or Iba ; and is a native of tropical Africa, being found in profusion on the West Coast from Sierra Leone to the Gaboon. It is largely used by the people of Gaboon, who eat it with fish and plantains. Miss Kingsley calls it a delicacy. The flowers, which are small and yellowish green, have a perfume.

The fruits, which are like plums, are gathered together in a heap till the pulp has putrefied. The stones are then cracked and the kernels taken out in order to be crushed with a wooden pestle in a large mortar. Then the mass, placed in a basket, is exposed to the sun, which melts it into a stiff substance. It is finally cooled, when it becomes hard like cheese. It can be kept a long time if wrapped in leaves and a cloth, so as to be hung up inside a house.

Tucuma

(*Astrocaryum Tucuma*)

It is called Tucuma in Brazil ; Awarra Palm (British Guiana) ; and is a native of tropical America.

The fleshy part of the fruit is an esteemed food (Seeman).

Probably this is the Palmier Avoira of French Guiana, and Aublet says it yields an oil for frying fish in ; also butter from the kernel, of a very good taste, which many prefer to real butter.

Acuero

(*Astrocaryum aculeatum*)

It is called Aquiro or Acuyurui, in British Guiana ; Avourra (French Guiana) ; and is a native of tropical America. The fruit is used like butter. The pulp and kernel have oil.

Comon

(*Ænocarpus Cacaba*)

It is called Comon in French Guiana. The fruit is often cooked in water with salt. An oil is obtained from it for seasoning food. A drink is also made from it.

Souari Nut

(*Caryocar species*)

A native of tropical America ; and sometimes called Butter-nut. One author states that it is one of the most delicately flavoured of all nuts. In Trinidad the kernel is pounded to extract the oil, which is sold in the market under the name of "ghee."

Sapucaia Nut

(*Lecythis zabucajo*)

A native of tropical America and West Indies, and sometimes called Canari Macaque. This nut is extremely

nourishing, and much used as food, especially in the mountainous parts.

Avocado Pear

(*Persea gratissima*)

It is also called Aguacate in Venezuela, Panama and Toboga; Palta in Peru; Avocat in the Caribbee Islands; and Abacateiro in Brazil. The tree grows wild, and is also cultivated in tropical America, being found in forest tracts near the coast growing in humid soil. The best variety in Mexico is called Ahuaca Dulce Largo.

The fruit must not be pulled before maturity. It is eaten with pepper and salt. Some people mix it with lime-juice and sugar; others boil and eat with salt beef or salt fish, but it is usually eaten on bread (with pepper and salt), as it contains 8 per cent. of oil (or butter).

Pínot

(*Euterpe oleracea*)

A native of tropical America, called Pinot in French Guiana; Palmito (Brazil). The fruit yields a very refreshing drink called "assai," similar to that derived from Patawa (*Cenocarpus Batawa*). *Euterpe edulis*, which is called Jissara, and also used to prepare "assai."

Yukissé is the general name given to all kinds of vegetable juices. Yukissé is generally eaten with farinha (from Manioc) with or without sugar. The Portuguese Brazilians called these drinks "vinho."

In the East Indian Archipelago, butter is obtained from Kanarie (*Canarium commune* ?), a native of Borneo, Java, Sumatra, and abundant in Damma Island, Arru Islands, Malacca Archipelago. The fruit yields the oil (butter). J. Low mentions a *Canarium* in Malacca, called "kras," which is probably the same. In Borneo a species of *Dipterocarpus* (*Diploknema sebifera*), called, locally, Miniak Mencabang, or Miniak Tankawan, yields a very large quantity of oil from the nut, which is used for cooking. The Katiow tree, chiefly found on the Sadong, Lingah, and the Kallekka Rivers, Borneo, yields an oil from the seed. The oil is called "miniak katiow," being cheap, abundant, with a perfume like almond oil, and much valued for cooking. There is a tree in Borneo called Panguin Edule, yielding an oil called "miniak kapayang," which is esteemed for cooking. This tree is cultivated, and the oil is obtained from the ripe seeds which can be obtained nearly all the year round.

In North India mustard-seed oil, and in many parts of the tropical world groundnut oil, is much used.

Voua-azigné is an oil of an agreeable flavour, constantly eaten with rice in Mauritius.

CHAPTER VI

VEGETABLES

Egg Plant

(*Solanum melongena*)

THIS is the Brinjal (Hindustani); Kha-yan (Burmah); Kia (China); Trong (Malay); Kuthirckai, etc. (Tamil); Chiri-vanga, etc. (Telegu); Bengan (West Africa); Beringela (Brazil); Valanghanna, or Garden Egg (Jamaica); Tongu (Angola, West Africa); Macumba (Congo, West Africa); Berengena (Venezuela); and Gauta (Hausa, West Africa).

There are two principal varieties, one with fruit the size of a large orange, and shaped like an egg; and the other more the form of a cucumber. Both are of a fine deep purple colour. In Bengal the seeds are sown at the beginning of the rains, and planted out $1\frac{1}{2}$ feet apart. The soil should be a sandy loam, and not too rich, otherwise too much foliage is produced.

This vegetable is much eaten throughout the tropics. It is roasted in hot ashes, the skin removed, and mashed with salt, peppers, lime-juice or oil; or cut into slices and fried in oil; or pickled when young and tender in oil, pepper, and salt. It is sometimes par-boiled to take off the outer skin, which is rather bitter, and then fried in oil.

Ochro

(*Hibiscus esculentus*)

A native of Upper and Lower Guinea, and Mozambique district, Africa. It is called Ochro (West Indies); Vendi, or Bhendi, etc. (Tamil); Venda-kaya, etc. (Telegu); Ventak-kaya (Malay); Gombaud (French Guiana); Bhindi (Hindustani); Ba-lu-wa, or Youn-padi-si, etc. (Burmah); Bandaki (in some parts of Africa); Bamia (Soudan and Egypt); Guingombo (Brazil); Bete, or Vauvau ni Viti, in Fiji; Quinbombo (Venezuela); Calalou; and Quiabo, etc.

The seeds are sown at the beginning of the rainy season.

The boiled unripe pods are a favourite vegetable, when very young, for making pickles; when more mature, for curries. They are also used in soups; or cut into small pieces and fried.

The pods are sometimes dried for storage, as follows: They are cut in slices the short way, put on a sheet of paper in the sun to dry, turned now and then, and in about three days are dry enough to keep. They should be put in the sun occasionally, if long kept.

The lobed leaves are tender eating as a potherb, especially if not quite developed.

Porcher states that the pod contains an enormous amount of albumen.

Chocho

(*Sechium edule*)

A native of Central America, and called Chuchu in Brazil; Chayota in Venezuela; and Chou-choute in

Réunion, French West Indies. The large fruit is green or cream-coloured, according to the variety, and covered with soft prickles. It is much cultivated in South America and the West Indies.

The fruit is a most wholesome vegetable cooked like Squash or Pumpkin ; it can also be made into tarts with limes. It is sometimes added to soup ; or soup made of it ; or is eaten boiled, and mashed with oil and pepper, the skin being first removed. Lunan recommends it dressed with lime-juice and spices.

Bottle Gourd

(*Lagenaria vulgaris*)

It is also called Club Gourd, or White Pumpkin ; Charrah (Arabic) ; Kaddu, etc. (Hindustani) ; Hu-lu (China) ; Soriai-kai, etc. (Tamil) ; Kunda-nuga, etc. (Telegu) ; Bella-schora (Malay) ; Bu-sin-swai (Burmah) ; and Calebasse-terre (French Guiana). It is a climbing plant, wild in India, the Moluccas, Abyssinia, and extensively cultivated in all hot countries.

In India it is sown in patches 6 feet apart, in rather sandy soil, during the months of April and June. In appearance it is like two oval gourds united end to end. It has white flowers.

Boiled when young, it is used like vegetable marrow ; or sliced for curry ; or mixed with rice. If hung up in a free current of air, it keeps well three or four months. The young shoots and leaves are also eaten.

White Gourd

(*Benincasa cerifera*)

A native of Japan and Java, and cultivated throughout Asia, the Islands, Africa, etc. It is also called White Gourd Melon, or Chinese Wax Gourd, and Gol-Kaddu (Hindu-stani); Peh-kwa, etc. (China); Kaliyana-pushinik-kay (Tamil); Burda-gumudu, etc. (Telegu); Kumpalanna, etc. (Malay); and Kyauk-pa-yon (Burmah). It is a very large egg-shaped climbing gourd, covered with pale greenish white bloom, and white pulp inside. The young fruit is used in curries as a vegetable; or as a sweetmeat. It is said to have cooling properties.

Purslane

(*Portulaca oleracea*).

A native of India. It is called Parpukire, etc. (Tamil); Pappukura, etc. (Telegu); Koriechira (Malay); Mya-byit (Burmah); Kourfakara-or, etc. (Arabie); Rijel (Soudan, Africa); and Ma-eh-i-hien (China). There are three varieties in cultivation, Green, Golden, and Large-leaved Golden Purslane.

The leaves contain oxalate of potash, mucilage, etc., and are refrigerant, slightly astringent, diuretic, antiscorbutic, preventing also liver diseases. They are largely eaten as a potherb in the form of spinach, or in curries.

The young shoots also make an excellent salad.

Karela

(*Momordica charantia*)

Called Karela, etc. (Hindustani); Pavakka-chedi, etc. (Tamil); Kakara, etc. (Telegu); Kaippa-valli (Malay); Ke-hin-ga-bin (Burmah); Mboga-kibaniani (Kiswahili, East Africa); Hairy Cerasee (Jamaica); Condeamor (Venezuela); and Quisaulbarri (Arabic). Sow in June, as the rainy season variety (Kareli) is the best. It requires support for climbing. Considered a cooling tonic, stomachic, and antibilious.

The fruit is a bright orange yellow, 1 to 6 inches long. Sliced, dried, and kept in an airy place, it remains good many months. Treat with salt and water, or hot water before cooking or frying, to remove part of the bitterness. Cook in curry, or slice and fry.

Indian Spinach

(*Basella alba*)

Called Poi, etc. (Hindustani); Vasla-kire (Tamil); Alubachechali, etc. (Telegu); and Basella-kira (Malay).

White Basil is a twining plant, and the succulent stems and leaves are an important article of food as a potherb in curry, etc. It is a wholesome vegetable, and makes good spinach.

Red Basil.

(*Basella rubra*)

Called Poi, etc. (Hindustani); Shivappu-vaslakire (Tamil); Allabatsalla, etc. (Telegu); and Chovvauna-

basella-kira (Malay). The flowers of this species are rose-coloured.

Much cultivated throughout India as a potherb.

Luffa

(*Luffa acutangula*)

A native of tropical India and Malaya, and called Torai, etc. (Hindustani); Pikunkai (Tamil); Burkai (Telegu); Djinji, or Kelula-manis (Malay); Tha-bwot-kha-wai (Burmah); and Papengaille (Réunion). The fruit is produced during the rainy season. Sow from March to June in lines 5 feet apart; supports should be given to the young plants, when 4 inches high, for them to climb upon.

If the fruit is longer than 4 inches it is useless for the table, but, if young, is highly esteemed, and considered one of the best indigenous vegetables. It is peeled, boiled, and dressed with oil, pepper, and salt; also used in curries. Balfour states that the leaves are a favourite potherb, and considered very wholesome.

(*Luffa aegyptica*)

A native of India, and called Ghia-tarui, etc. (Hindustani); Guttibira, etc. (Telegu); Tha-bwot (Burmah); Luff (Arabic); Konyikon (West Africa); and Estropajo (Venezuela). Cultivated like the last, but the fruit is smaller, and used similarly in curries, etc. It is much cultivated during the rains, and is considered a delicious vegetable. Luffa Petola is called Courge Torchonin in French Guiana.

Snake Gourd

(*Trichosanthes anguina*)

Probably wild in India, or Indian Archipelago, but grown throughout India as a rainy-season crop. It is sown in April and May, and cultivated like a cucumber. It is called Purwul, etc. (Hindustani); Linga-potla, etc. (Telegu); Pai-len-mwae (Burmah); Patole (Réunion); and Petala-ular, etc. (Malay).

This Gourd is used as a boiled vegetable, also in curry.

(*Trichosanthes dioica*)

A native of the plains of North India, called Parvar (Hindustani); Kombu-pudalai (Tamil); Kommu-potla (Telegu); and Patolam (Malay). Extensively cultivated during the rainy season in the same way as other gourds.

The unripe fruit is much used as a vegetable, being considered very wholesome; it can be cooked in various ways—either boiled, after cutting in half, and served with oil, salt, and pepper as a vegetable; or fried; or else cut in slices and stewed in sauce. It is also used for curry, and can be preserved in syrup with cinnamon and vanilla. If gathered when young, and less than four inches in length, it can be cut into thin strips, and boiled like French (spring) beans.

Sag

(*Amarantus gangeticus*)

A native of India, and called Lal-sag (Hindustani); and Bayam (Straits Settlements). It is pulled up when ready,

and sold entire. The leaves and tender stalks are used in curry.

(*Amarantus oleraceus*)

called Sag (Hindustani); Totakura, etc., in Telegu; and Tand-kirai in Tamil language.

(*Amarantus Tristus*)

called Sirru-kirai, etc. (Tamil), and Sirru-kura (Telegu), extensively cultivated, and held in much esteem.

It may be cut down several times without destroying the plants, for they soon shoot out vigorously again. It is preferred to *Amarantus oleraceus*, which yields only one crop.

In Mauritius, Bourbon, and the Seychelles, "sag" is called Bréde de Malabar, and the common variety in Brazil is called Carurú.

Jew's Mallow

(*Corchorus olitorius*)

Indigenous in many parts of India, and generally distributed by cultivation in all tropical countries. It is called Singin janascha, etc. (Hindustani); Peratti-kirai, etc. (Tamil); Parinta, etc. (Telegu); Phet-wun (Burmah); Oimoa (China); Rami-tsjua (Malay); Melokieh, or Molukhia, etc. (Africa); and Carruru de Bahia (S. America).

It is commonly cultivated in tropical India, Africa, etc. The leaves are used as a potherb.

Sim, or Country French Bean

(*Dolichos lablab*)

This Bean is wild and cultivated throughout India. Sim, etc., is the Hindustani name; Mutcheh, etc. (Tamil); Alsanda, etc. (Telegu); Pai (Burmah); Pien-tau (China); and Jéve d'Egypte, or Feijao da India (French Guiana).

It is extensively cultivated for its green pods, which are used like French beans.

The stems are a valuable fodder.

Papaw

(*Carica papaya*)

The fruit of this tree is used as a vegetable, when it is green and unripe. (See Chapter VIII.)

CHAPTER VII

SUGAR

Palmyra Palm

(*Borassus flabelliformis*)

THIS and the following palms, along with Maguey and Sugar-cane, are the sources from which the inhabitants of tropical countries obtain their sugar. As will be seen, it is obtained without much trouble, often from poor soil, and the crop does not require yearly renewal like the Sugar-cane. The above palm is called Tal (Bengali and Hindustani); Lontar (Malay); Rontal (Java); Tati (Telugu); Panaimaram? (Tamil); Pana (Malay); and Htan (Burmah). This Fan Palm is plentiful on the east and west coasts of Madagascar, especially on the warm plains. It is cultivated throughout tropical India, Burmah, Ceylon, and East Indian Archipelago. It is the Toddy Palm of South India, Konkan, Burmah, and Ceylon.

The juice, or toddy, is called "ras," and before sunrise is sweet and agreeable, and while fresh is consumed as a beverage, but after sunrise it ferments rapidly. The fresh juice, boiled down to remove moisture, yields "jaggery," which consists almost entirely of sugar. The vessels, used for collecting toddy to be made into "jaggery" (sugar), have

a small piece of lime or charcoal put into them to prevent fermentation. In Konkan, Thana District, India, this Fan Palm is the chief sugar-bearing tree, grows wild all over the district, and is found by tens of thousands in the coast subdivisions. The palms are male (Talai) and female (Tad), and the juice of both is equally good.

In twelve years it is ready to tap, yielding Toddy for about fifty years. In the male tree the toddy is drawn from the "lendis," which are fingerlike growths, 12 to 15 inches in length, in clusters at the top of the tree. Each finger is beaten with a piece of stick along its whole length, and all the fingers of the cluster are then tied together. In three to four days the points of the fingers are cut by the "aut," a sharply curved knife with a keen, flat, broad blade, and are continued to be cut daily for two weeks, as soon as the juice begins to flow.

Under the tips of the fingers earthen pots are placed into which the juice drops, and, to keep the crows away, a sheath of straw is bound round the "lendis," so as to close the mouth of the pot. The female tree gives out spikes 12 to 15 inches long, with fruit seated all round the side, as in a head of maize. When the juice begins to flow, the fingers of the male and spikes of the females must have their points cut morning and evening.

The juice of the Palmyra Palm is richer in saccharine matter than most other palms, and Forbes says that 3 quarts of juice makes 1 lb. of jaggery. When the toddy, before fermentation, is boiled it becomes a thick syrup, and a small quantity of scraped coco-nut kernel is thrown in to ascertain if it is of proper consistency; it is then poured into baskets of Palmyra leaf, where it cools and hardens. The

sugar is kept in those plaited Palmyra baskets, and is called "jaggery sugar."

Toddy serves extensively as yeast, and throughout Ceylon no other is employed by the bakers. A large amount of toddy is converted into vinegar and used for pickling gherkins, limes, and the undeveloped leaves of the Coco-nut and Palmyra Palms; but by far the greatest quantity is boiled down for jaggery (sugar). About one thousand tons are said to be manufactured in Ceylon annually.

Doctor Brandis states that nearly all the sugar made in Burmah, and a large proportion made in South India and Konkan, is procured from this palm. Sugar-candy, made from it, is imported into Calcutta from Ceylon, Madras, and East Indian Archipelago. Jaggery is also the Burmese name for sugar made from this palm.

Caps, rain-hats, cups, rice-jugs, plates, water-pails, water-baskets, cooling-baskets, baskets for storing grain, oil-press baskets, clothes-baskets, sieves, mats, leaf punkhas, screens, fences, thatch, etc., are made from different parts of this palm.

Black Run Palm

(*Borassus flabelliformis*, var. *aethiopicus*)

A native of tropical Africa. It is called Deleb Palm (North tropical Africa); Dolape (Arabic); Mvumo (Kisuah, East Africa); Kawe (Bagirmi, West Africa); Uray (Musgu, West Africa); Sibbo-Colono (Gambia); Moumbo (Ugogo, East Africa).

The trunk of the tree about midway is very much enlarged in diameter, thus distinguishing it from other varieties of palms.

The fruit when allowed to ripen is exceedingly rich, and has a perfume like apricots. The Arabs cut it in slices, and boil it with water till a strong syrup is obtained.

Toddy is obtained from it at Benguela District, West Africa.

Date Sugar Palm

(*Phœnix sylvestris*)

A native of India, called Sendhi, etc. (Hindustani); Itchumpannay, etc. (Tamil); and Ita, etc. (Telegu). It has no root suckers, and is thus distinguished from the Date Palm (*Phœnix dactylifera*) from which edible dates are obtained, and the leaflets make half a right angle with the common petiole. It is found most abundantly in Bengal, Behar, Coromandel Coast, and Guzerat; there are also extensive forests at Rohilkhand, on low ground along the Ranganga River, and on the plateau of Mysore between Shimoga and Tumkur, India.

It is commonly cultivated and self-sown in India and Ceylon, except Sind and South West Punjaub.

The trees are planted 12 feet apart, and left untouched until the seventh year, when the tapping for juice commences. There are two series or storeys of leaves: the crown leaves, which rise straight out of the top of the trunk; and the lateral leaves, which spring out of the side of the top part of the trunk. When the rainy season is over the lateral leaves are cut off for half of the circumference, and thus leave a

bare space, measuring 10 to 12 inches each way. The surface thus laid bare is not the woody fibre of the tree, but the bark, formed of many thin layers. Leaving it exposed for a few days, a cut is then made into this exposed surface in the shape of a very broad V, 3 inches across and a quarter or half an inch deep. Then the surface inside the angle of the V is cut down so that a triangular surface is made on the tree. From this the juice exudes and runs down to the angle of the V, where a bamboo, the size of a lead pencil, is inserted to catch the toddy and carry it out as on a spout. The tapping is arranged throughout the season by periods of six days each. On the first evening a cut is made as described and the toddy runs during the night; and is collected in the morning in the pot hanging beneath the bamboo spout. The second evening a new cut is made, not so deep as the last, but merely a paring, and the toddy is allowed to run all night. The third night no new cutting is made, but the exuding surface is made quite clean. After these three nights it is allowed to remain three nights at rest, then the same process is begun again. The cuts in one season are made about the same place, but in alternate seasons alternate sides of the trees are tapped, and thus each season's cuttings are above the previous season's cuttings and on the opposite side. The notches are generally on the east and west sides. The average produce from one good tree is about 11 lbs. (excluding quiescent nights), and it will go on yielding for forty years. Tapping commences at the beginning of November, and during December and January the juice flows best.

Every grower at once boils his toddy down to "gur"

(sugar) by placing it in large pots on a perforated dome, with a strong wood fire underneath. The toddy when boiled becomes a dark brown, half viscid, half solid mass of crude sugar, and, when still warm, is poured from the pans into earthenware pots, in which it is stored, and will keep a very long time. Seven to ten pounds of toddy produces two pounds of crude sugar (gur). Fifty thousand tons of sugar is annually produced from this and other palms in Bengal. Sometimes the toddy, before fermentation, is sold for drinking.

The leaves are used for making mats, baskets, bags, brooms, and fans. The leafstalks are beaten and twisted into ropes.

Mari Palm

(*Caryota urens*)

Called in Bombay the Hill Palm. In Malacca and Borneo, Nibong; Mhar-mardi, etc. (Telegu); Conda-panna, etc. (Tamil); Shunda-pana (Malay); and Minbo (Burmese).

This tree is highly valuable, yielding during the hot season immense quantities of toddy—sometimes 80 pints in twenty-four hours, and continuing to flow for a month. The juice is a pleasant drink before it ferments. The trees are tapped when fifteen to twenty-five years old, and the tapping goes on for eight months in the year, but is stopped during the rainy season. Besides bruising and binding, the spathe, which is called “koti,” is heated to make the toddy flow. The trees are not allowed to rest, but are

tapped until exhausted ; and in good ground will last ten years and in poor ground four to five years.

The pith of the trunk of the old tree is said to be equal to the best sago. It is made into bread or boiled into thick gruel, forming in some places a great part of the diet of the people. It is believed to be highly nutritious. Roxburgh considers it as palatable as the ordinary sago.

Gamble says that the leaves yield kittul (salopa) fibre, which is made into ropes, brushes, baskets ; and the fibre from the sheathing leafstalk is used for making ropes and fishing-lines.

The sugar is prepared from this palm in the same way as that of the Palmyra Palm.

Gumutí Palm

(*Arenga saccharifera*)

A native of India, Cochin-China, Philippines, South Japan, Burmah, Orissa. It is called Anau (Penang and Sumatra) ; Gula-malaka (Malay) ; Aren (Java) ; Kabong (Malacca) ; Tsongli (Philippine Islands) ; Cay-duac (Cochin-China) ; and Taung-ong or Langkap (Burmah). Generally cultivated in India, Malacca, etc., for sugar, which is obtained in the following manner.* One of the spadices is, on the first appearance of fruit, beaten for three days with a small stick, in order to determine juice to the wounded part. The spadix is then cut a little way from its base, and the toddy pours out into an earthenware pot or bamboo. In order to make sugar (jaggery) the toddy is boiled to a syrup and put

* As described by Simmonds in "Tropical Agriculture," p. 248.

out to cool in small vessels, the form of which it takes, and is in this shape sold in the market. The female tree yields fruit, and the male tree only toddy. Each spadix (mayam) yields toddy at least three months, and fresh mayams appear as the old ones are exhausted. Dr. J. E. de Vry says that when the toddy is to be made into sugar, the vessels in which it is collected are smoked, in order to prevent fermentation. The juice is immediately poured into shallow basins, heated by fire, and thickened by evaporation, till a drop falling on a cold surface solidifies. Thus concentrated it is put up in the form of large prismatic lozenges, and sold in the market.

Nípa Palm

(*Nipa fruticans*)

A low stemless palm, growing in the soft marshes of the islands of the Indian Ocean, East Indian Archipelago, and Philippines, etc. It is called Dane (Burmah); Atap (Malay); Cay-dua-nuoc (Cochin-China); Gim-pol (Sinhalese); and Sasa (Philippine Islands).

The Malays, extract a saccharine juice (toddy) from the spathe, called "nira," and, when evaporated by boiling down, a sugar called "manisan" (jaggery).

In the island of Savu (lat. $10^{\circ} 35'$ south) the toddy is called "dua," "duac," or "tuac," and the sugar "gulia." In "Cook's Voyages" (Hawksworth), it is stated that "the sugar was reddish-brown, and more agreeable to our palates than any unrefined cane sugar we had ever tasted." The unfermented toddy was called "tuac manisc."

The leaves are used as thatch, and the leafstalks for the frame and floor of huts.

Maguey

(*Agave salmania*, or *atrovirens*)

Twenty-two species of Maguey are enumerated by Blasquez as yielding "aquamiel," and of this number six produce the finest quality. In Mexico the great district for this plant is the plains of Apam, where there are six hundred square leagues covered with it.

As soon as the leaves begin to turn yellow, a small concave opening is scooped out in the core of the plant by means of a keen-edged knife; this aperture is gently scraped round, care being taken that no incision be made into the leaves around it, as this would give a bad taste to the juice. This opening produces a sediment called "raspa," through which the juice (aquamiel) exudes from the grooves of the plant. The juice is extracted by means of a bottle-gourd (the air in which is exhausted by suction), which is thrust into the core of the plant, the aperture at one end being stopped with the finger; as soon as this is full the contents are emptied into a kind of sheepskin bag. The average quantity yielded by a plant is roughly estimated at 100 arrobas. The Mexicans know the exact time at which the stem or central shoot, destined to produce the flower, is about to appear, and they anticipate it by making an incision and extracting the whole heart or central portion of the stem, leaving nothing but the thick outside rind, thus forming a natural basin about 2 feet deep

and $1\frac{1}{2}$ feet in diameter. Into this the juice, which Nature intended for the nourishment of the gigantic central shoot, continually oozes in such quantities that it is sometimes found necessary to remove it two to three times a day. In order to facilitate this operation, the leaves on one side are cut off so as to admit a free approach. The aquamiel before it ferments is extremely sweet, and can be evaporated to correspond with the "jaggery" of India.

Ropes, nets, table-mats, thatch, thread, cords, pins, and needles are made from the leaves.

Bamboo Palm

(*Raphia vinifera*)

This palm is called "Ukot" in Old Calabar, West Africa, where it is cultivated; and at Usambara, East Africa, is called "Mwale." It is common in Yoruba, Nupe, Upper and Central and Lower Guinea, Africa, and Fernando Po. The toddy (juice) is called, by the Arabs, Lagmi or Lagby, and Bourdon in some parts of West Africa.

The toddy, which is produced in large quantities, is obtained by cutting out the terminal inflorescence (flowering part) as soon as it appears. Another authority says, in regard to the toddy of West Africa, that the trunk of the tree is tapped under every branch of fruit, and each opening yields nearly a gallon in a day.

The dried pinnæ of the leaves are used for making ropes; the long midrib of the leaflets for roofing, which lasts three years; the soft inside for mats; leafstalks as poles to carry palanquins; brooms from the midribs of the leaves, and

baskets of the leaves themselves. Cloth is manufactured from the epidermis, or outer surface, of the leaflets; and on the Sherboro, West Africa, hammocks, baskets, and mats are made of it.

Wild Date Palm

(*Phoenix spinosa*)

This is not the palm from which the dates of commerce are obtained in North Africa, but is a native of tropical Africa from Senegal to Kaffraria. It is called Mkindo (Kisuh, East Africa); Msala (Usambara, East Africa); and Brab (Africa).

Moloney states that toddy is procured from this species.

The very young leaflets, before the leaves expand, are used for the plaiting of hats or caps at Accra, West Africa. In Zanzibar mats are made from the leaves.

East African Doum Palm

This palm is probably *Hyphæne coriacea*, of East Africa and Madagascar, and called Mkotsche in the Kisuh dialect. The juice of it is stronger than that of the coco-palm.

In Case 56, No. 113, Museum No. 2, Kew Gardens, London, there is a drawing illustrating the mode of collecting toddy at Kongone, Zambesi River, East Africa; also a cover made of the leaves for protecting the wounded surface during the collection of the toddy. Case 55 has strainers, spoons, mats, and a hat made from the leaves of probably this species of

palm. Case 56, No. 112, has swinging trays, used for carrying boxes in south-east tropical Africa, made of this palm.

Carnauba Palm

(*Copernicia cerifera*)

A native of South America from Brazil to Bolivia and Uruguay, but most extensively found in Ceara and North Brazil. It is called Caroudaï (Spanish America); and Carandais (Bolivia).

It yields toddy, from which sugar and also vinegar is obtained. The trunk yields a sago, and the fruit pulp is agreeable to eat. The Palmetto top when young is also a nutritious food.

Diaz says that with this palm you can furnish and light a house, and get nourishment; and Consul Morgan says that in no country is a plant applied to so many and varied uses. The wax obtained from the leaves is employed in the raw state for making candles, which give off a perfume while burning. The leaves yield fibre for hammocks and fishing-lines; the young leaves yield fibre for mats, hats, baskets, and mattresses; and the dry leaves are used for thatch.

Ita Palm

(*Mauritia flexuosa*)

A native of Tropical South America. It is called Muriti in Brazil; Morichi in Venezuela; Ita in British Guiana; and Palma Bache in French Guiana.

Toddy is obtained from this palm.

The central part of the trunk contains a sago like flour, called "ipuruma;" and Humboldt considered it very agreeable.

The fruit is covered with narrow scales resembling pine cones, and yields different articles of food, according to the time when it is gathered—saccharine when fully matured and farinaceous when immature. On the Amazon River a favourite beverage is prepared from the fruit by soaking a quantity in water till it begins to ferment, and the scales and pulpy matter soften and can be rubbed off. When strained through a sieve the liquor is ready, and has a slightly acid taste. Aublet says that bread is made from the large kernel in the stone of the fruit.

In British Guiana, fans and baskets are made from the split leafstalk, and sandals of the leafstalks. Tibisiri fibre, the cuticle (or skin) of the young leaves, being very strong and durable, is used for making hammocks.

Buriti Palm

(*Mauritia vinifera*)

This Palm is found in great abundance in Brazil, especially in the swamps of Piauhv and Goyaz, and is called Buriti. The "Guide to the Museum of Economic Botany," No. 2, at Kew Gardens, on p. 43, calls it the Wine Palm of Para, describing it as "a tall graceful palm with cylindrical trunk, from which a kind of wine (toddy) is obtained by cutting down the tree and making several holes about 6 inches square, 3 inches deep, and about 6 feet apart.

In a short time these holes become filled with a reddish-coloured liquid."

On the Rio Negro the hard outside portions of the trunk are used for building purposes. Between the outer scales and hard central part of the fruit a reddish coloured pulp is formed, which the inhabitants of Crato boil with sugar and make into a sweetmeat, or eat with farina. In Piahy, they prepare from this pulp an emulsion which, when sweetened with sugar, forms a very palatable beverage.

Hammocks and mats are made from the young leaves and cuticle (or skin) of the leaves.

Cahoun

(*Attalea cohune*)

A native of tropical America, called Corozales (Spanish), and Palma Real, or Corozo Gallinario (Panama).

Toddy is obtained from the trunk of the palm.

Seeman says that an oil, superior to coco-nut oil, is obtained from the nut by the following process:—Break the nut; pound the kernel in a mortar; boil till the oil rises to the top, and then skim it off. He does not state whether it is used for human food or not.

Sugar-cane

(*Saccharum officinarum*)

The inhabitants of tropical countries, so far as I have read, do not get their sugar from the sugar-cane, but from various palms and the Maguey plant. Sugar-cane is only

grown as a sweetmeat, being cut up in short pieces, the outer skin stripped off, chewed, and the fibrous part thrown away. The juice is a delicious drink, and contains 18·20 per cent. of cane sugar.

In Venezuela sugar is obtained as follows : The cane minus the leaves is taken to a mill, and the juice squeezed out between two strong iron rollers, then run into large iron pans, where it is boiled and inspissated by gradual evaporation, and finally poured into wooden moulds, of conical shape, about 15 inches high. It solidifies into brown sugar, called locally "papelón." In Borneo the Golden Yellow Cane is considered the best variety as a sweetmeat.

Sugar is a powerful antiseptic.

Coco-nut

(*Cocos nucifera*)

This Palm also yields Sugar, as described in Chapter V.

Banana

(*Musa sapientum*)

Called Guineo in New Granada ; and Bacove or Figue Banane (French Guiana). As a rule, the banana when ripe is small, round, sugary, and finely flavoured. The plantain, on the other hand, is large, coarse, flat, long, and in taste resembles rice or potatoes, showing that it contains a lot of starch ; it is generally gathered green and unripe, and boiled or roasted like a vegetable. The banana is a

saccharine dessert fruit, but does not develop its full perfection of flavour until it is in the last stage of ripeness. The bunch is cut as soon as one or two of the fruits begin to change colour, then hung up in the house for a week or so, by which time the whole bunch is yellow, ripe, and fit for food.

CHAPTER VIII

FRUIT

ALL fruits have a varying amount of tartaric, citric, and malic acids, fruit-sugar, and some volatile oil.

They would seem to have cooling properties, and also act as microbicidal antiseptics. Richet, in his "Dictionnaire de Physiologie," vol. i., p. 608, places the acids they contain in the third most powerful class of antiseptics. The volatile oil also acts in this direction (see the chapter "Condiments," p. 90).

Mango

(*Mangifera indica*)

De Candolle says this fruit is a native of the regions at the base of the Himalayas, especially towards the East, Arracan, Pegu, and the Andaman Islands. The two principal localities in India for growing mangoes are Mazagon in Bombay and Malda in Bengal. The best Indian varieties are :—

Class I. (1) Afooz, a Bombay variety. (2) Kuabog, a small green fruit, as good as the Afooz. (3) Durbhungah. (4) Gopalbogh, a Malda variety. (5) Durma, or Derrima, with a vanilla flavour. (6) Kishenbogh Durbhungah. (7) Buckley's Cowraya Malda. (8) Maharaj Pusund.

Class II. : Melon Mangoes (because of musk scent).—(1) Naroika Kerbuza. (2) Mohedenugger Kerbuza. (3) Dhoola Walla Kerbuza. All of these are of fine quality, and ripen late in July.

Class III. : Budayas.—(1) Fuzlee Bewa. (2) Durbhungah Budaya, with no fibre and thin skin. (3) Mohur Thakoor, one of the latest and best.

In Savu, East Indian Archipelago, the best varieties are Mangha Doodool, Mangha Santock, and Mangha Gure.

The choicest mango has no fibre in the pulp, and for flavour cannot be rivalled by any fruit in the world ; but a bad mango tastes like tow soaked in oil of turpentine.

Mangoes should not be eaten freshly plucked from the tree, but gathered when ripe and laid upon a shelf for a few days to mature.

The green fruit is used in various ways, the stone being first taken out, and the mango cut into halves or slices—(1) put into curries ; (2) made into a pickle with salt, oil, and peppers (chillies) ; (3) made into preserves and jellies by being boiled and cooked in syrup ; (4) boiled, strained, and with milk and sugar made into a custard, known as “mango fool ;” (5) dried, and made into ambchur, used for adding acidity to certain curries ; (6) when very young cut into small pieces, mixed with a little salt, sliced chillies, and milk, and made into a tasty salad.

When ripe (1) it is made into curry, giving it a sweet acid and not unpleasant taste ; (2) cut into small pieces, and made into a salad with vinegar and chillies ; (3) the juice squeezed out, and allowed to dry on plates, forming the thin cakes known as “ ambath ” in India.

Salted mangoes are much eaten with fish curries.

Tamarind

(*Tamarindus indica*)

A native of tropical Asia, the west side of Madagascar, and tropical Africa. It is called Imlee or Amlee (Hindustani); Puliya-m-pazham (Tamil); Assam (Sumatra); Itsen Yamia, and Tsamia (Hausa-land, West Africa); Madiro (Madagascar); Mquadschu (Kiswah, East Africa); Subar (Arabic); Looquajoo (Bari country, Central Africa); Mas (Bagirmi, West Africa); Mag-ye (Burmah); Cay-me (Cochin-China); Kamal (Java); Neghka (Malay); Mkwaju (Swahili language); and Hommar in Abyssinia.

In Venezuela, South America, the *Tamarindus occidentalis* is indigenous. The part used is the large flat pod filled with acid pulp.

It is largely eaten, being a favourite acid ingredient in curries and chutney; a cooling drink is also made from it by boiling the pulp in water and sweetening with sugar. It is specially useful during fever and biliary affections, and is considered as one of the fruits most beneficial to health in the tropics. In India the seeds and epicarp are more or less removed by hand, and the pulp generally mixed with about 10 per cent. of salt, and beaten or crushed into a mass. The seeds are largely eaten, the outer skin being removed by roasting and soaking, then boiled or fried; they are also used after being dried and ground. The Arabs steam, sun-dry, then knead it into balls with salt and oil to counteract the effects of damp; thus prepared, it will keep for years.

Lime

(*Citrus medica*, var. *acida*)

Called Nebu in India ; Limeira (Brazil) ; Lima (Venezuela) ; Futile (Peru) ; Limuetursh or Limu (Burmah) ; Cay-tan-yen (Cochin-China) ; Jaruk-tipis (Malay) ; Tanpulo, etc. (China) ; and is a native of various tropical countries.

The chief varieties in India are Patee, Kaghazi, and Gora.

The fruit is like a lemon, but smaller, with a thin rind and extremely acid juice, caused by the presence of much citric acid.

The fresh juice of the lime is used generally in cooking, giving a pleasant acid taste and agreeable flavour. A pickle, called "pati-nabu," is very popular in India, made with its own juice and salt. The small sour lime is used for making cooling drinks and lime juice, and the larger ones for making preserves. Limes are pickled with water, vinegar, cloves, and mace. Lime juice can be preserved by mixing it with sugar, then bottling, and keeping in a cool place, after straining.

Caju (Cashew Nut)

(*Anacardium occidentale*)

The geographical area of this tree is Central America, Brazil, Burmah, Malayan Peninsula, India, and Angola in Africa. It is called Acaju (Brazil) ; Mereï (Venezuela) ;

Morañon (Cuba, Panama, New Granada, and Ecuador); Kaju (Hindustani); Mundiri, etc. (Tamil); Jidi-mamidi-vittu, etc. (Telegu); Paranki-mava-kuru, etc. (Malay); and Thee-noh, etc. (Burmah).

The fruit is the succulent pear-shaped footstalk, bearing at its extremity a kidney-shaped nut. The pulp of the footstalk is sweet and cooling; the juice is extensively used in the preparation of a refreshing drink, which is known to prevent scurvy; also, stewed with sugar, it makes an excellent preserve. The kernel of the nut is extensively eaten, after being well roasted to remove the acrid oily principle which lies between the two outer coats of the kernel. This acrid principle is somewhat difficult to remove. When the kernel is young it is said to be better than the walnut; when older it is usually roasted, or sometimes ground up with cacao, and makes an excellent chocolate. The kernels are also made into confectionery with sugar.

Guava

This is the fruit of different varieties of the genus *Psidium*, which is a native of dry mountains in Guiana, Brazil, etc.

The following Brazilian varieties are considered the best: (1) *Araça do Matto*—a little acid, but agreeable; (2) *Araça Roxo*—agreeable, sweet, and a little astringent; (3) *Araça-merim*—with a sweet taste; (4) *Araça Pera*, or purple Guava, of delicious flavour; (5) *Araça Goiaba*, or Larger Yellow Guava—a little astringent; (6) *Araça*

do Campo, with an agreeable taste. In Venezuela a Guava is called Guayave; Guayabo (Peru); Jambu-biji (Malay); and Loue-kiae, etc. (Siam).

The fruit has a strong aromatic flavour, and Europeans like it stewed; baked; in the form of jelly; or made into the well-known "guava cheese." The jelly is made from the Larger Yellow Guava. Guava cheese is prepared from pulp left over after making guava jelly. The pulp is strained to remove the seeds; lime juice and sugar added; and then boiled till it is fairly solid. Guava jam is called "goibada" in Brazil. The rind is often stewed and eaten with milk; or made into marmalade.

Mangosteen

(*Garcinia mangostana*)

A native of the Molucca Islands, etc., cultivated in South-East Asia generally. It is called Men-gut, etc. (Burmah); Mang-cut (Annam); and Mong-khut (Cambodia and Siam).

The pulp of the fruit is soft, juicy, refrigerant, with a mixture of sweetness and acidity. It has an extremely delicate flavour and aroma; but to taste the fruit in perfection it must be eaten as it is gathered from the tree. It is considered very beneficial in fevers, and excellent vinegar is made from the fruit in Java.

It does not grow well in the open plains, but succeeds best in hot moist valleys. The seeds are generally abortive, so that, if plants are wanted in other countries, cuttings or suckers must be obtained.

Durian

(*Durio zibethinus*)

This fruit is a native of the Malay Islands, Malay Peninsula, and South Tenasserim; and is extensively cultivated. It is called Duyin (Burmah); and Mfinessiya-kisungu (Kiswah, East Africa).

It must be eaten at a particular time of ripeness, and will not keep longer than five to six days after plucking. The Burmans cover it with a cloth and coat it with clay to make it keep. It is very aromatic, which is probably due to the presence of a volatile oil. Colonel Biggs says that "it is richly and highly flavoured, resembling marrow rather than fruit, and decomposes rapidly when ripe, when its odour becomes very disagreeable. This has caused it to be disliked by some who have not been able to eat the fruit fresh from the tree. It is beyond question the finest fruit in the world." Wallace says "it is worth a journey to the East to taste it, because it has such an exquisite flavour."

Pine-Apple

(*Ananas sativa*)

This well-known fruit, which is a native of Tropical America, and generally found growing in dry localities on the outside of forests, is extensively cultivated throughout the tropical world.

Cherimoyer

(*Anona cherimolia*)

A native of tropical America, especially South Mexico, in the Orizaba region, Jalapa, and Panama at Chiriqui. Huanaco in Peru (5000 feet) and Loja are famous for this tree, which, when in flower, has an exquisite scent.

It is considered by the Creoles the most delicious fruit in the world. Dr. Seeman says, "The best quality of fruit is grown on the slopes of the Andes," so that apparently elevated districts are best suited for it. The pulp of the fruit has a strong aroma, which is probably due to the presence of a volatile oil.

Sapodilla

(*Achras sapota*)

A native of the West Indies and Central America. It is also cultivated throughout India. It is also called Sapota, Bully Tree, Naseberry, and Nispero in Venezuela; Sapote (Peru); and Sapatilla (St. Domingo).

The fruit when ripe should be kept for two or three days, thus making it soft and mellow. Firminger says that "a more luscious, cool, and agreeable fruit is not to be met with in India, or perhaps in any country."

Papaw

(*Carica papaya*)

A native of the shores of the Gulf of Mexico, West Indies, to Peru, etc. It is called Mamociro (Brazil); Lechosa

(Venezuela); Papayo (Peru); Thin-bau, etc. (Burmah); Muh-kwa (China); and Papa, etc. (Malay). The flowers with the male (on long stalks) and those with the female (with no stalks) organs grow on separate trees.

When the fruit is green it is peeled, boiled, cut into small pieces, and served with oil, vinegar, salt, and pepper, thus forming a very palatable vegetable; it is also used in curries or pickled in vinegar.

When ripe it is eaten raw, either with sugar, or with pepper and salt.

Sloane says "the unripe fruit is cut into slices, soaked in water till the milky juice is removed, then boiled or baked, and eaten with pepper and salt."

The milky juice of the tree, much diluted with water, is often used to make tough meat tender. The meat is washed with the juice, and the action is due to a ferment, which has the effect of separating the muscular fibres. It is often sufficient to wrap the meat in the leaves for a short time—perhaps half an hour—to obtain the same result.

Custard Apple



(*Anona squamosa*)

This fruit is also called Sweet Sop, or Sugar Apple, and is a native of the West Indies and tropical America. It is called Atta (Brazil); Anon (Venezuela); Manoa-Papoua (Malay); Serikaya (Java and Malacca); Ame-sa, etc. (Burmah); Fan-lih-chi (China); Sharifah (Hindustani and Arabic); and Sita-palam (Tamil).

General Jenkins says that it grows spontaneously in India, in the most rocky and barren places.

The custard-like substance of the inside of the fruit has a most delicious and delicate flavour and aroma.

Sour Sop

(*Anona muricata*)

A native of the West Indies and Tropical America ; called Guanabano (Venezuela and Peru) ; and Corossol (French Guiana).

Mr. Gosse says it is lusciously sweet, and of a delightful acidity. The acidity is due to malic acid, etc. An agreeable beverage is made by dissolving it in water, straining, and adding sugar to taste.

It has a very cooling effect in fevers.

Rosella

(*Hibiscus sabdariffa*)

Called Red Sorrel in the West Indies ; Vinagreiro (Brazil) ; Tocoswas (North-east Africa) ; Lal-ambari (Hindustani) ; Shivappu-kashurukvirai, etc. (Tamil) ; Erragom-kaya, etc. (Telegu) ; Polechi, etc. (Malay) ; Chin-poung-ni, etc. (Burmah). It is a native of tropical Asia and Africa, and widely cultivated in the West Indies, India, Burmah, Ceylon, Queensland, etc. A moist climate seems to suit it, and the red variety is the best.

It is not the fruit itself which is made use of, but the thick succulent sepals which envelop it ; these are used

for making a pleasant acid drink ; also for jam and jelly ; most delicious puddings can also be made with them. In the fresh state it is very acid and refreshing. In Burmah the leaves are used in salads and curries, like spinach ; for soup ; and also as greens.

A general consensus of opinion appears to exist regarding its valuable antiscorbutic properties.

Pumelo

(*Citrus decumana*)

Also called Shaddock, or Pompelmos ; Shouh-ton-oh (Burmah) ; Shanktones (Malay) ; Buoi (Java) ; Hiu or Yu (China) ; Laranjeira Turanga (Brazil) ; and Moli-kana (Fiji). It is a native of the Malay Archipelago, Friendly Islands, Fiji, and cultivated in most tropical countries, especially in India and Burmah.

There are two varieties, one with white pulp, and one with deep red or purple pulp. The deep red variety is the most esteemed. When very large, it is called "pom-poleons," or sometimes "pilmousses ;" and when small, is called "forbidden fruit." Firminger says it must not be gathered too soon, and must be left on the tree as long as possible. It keeps a long time.

Jack Fruit

(*Artocarpus integrifolius*)

Called Pila, etc. (Tamil) ; Panasa-pandu, etc. (Telegu) ; Peingnai, etc. (Burmah) ; Mfinessi (Kisuah, East Africa) ;

Khantal, etc. (Hindustani); Choohada (Sumatra); and supposed to be a native of the mountain forests of the Western Ghats and the Eastern Ghats, India. There are two varieties: (1) Kujja, or hard kind with much edible pulp, exterior of the fruit smooth and green, and the seeds (or nuts) comparatively small; (2) Ghila, or soft kind, much smaller, inferior, with rough exterior. Major Drury says that if it is planted in stony soil it will grow short and thick, in sandy soil tall and spreading; but if the roots come in contact with stagnant water the tree will not bear fruit. As the fruit ripens the tree is covered with mats, etc., to protect it from birds.

The external rough skin of the fruit is rejected, and the yellow pulp which surrounds the seeds is eaten. It is regarded as one of the best Indian fruits, having a strong smell and flavour, but which gains on the taste. One authority states that "it has a luscious sweetness."

The unripe fruit, after the rind is removed, is cut into small pieces, and cooked in curry with shrimps, etc. The ripe pulp and seeds are also used in curry.

The seeds of the ripe fruit, when roasted, are eaten, and resemble chestnuts; or they may be ground into flour; used in curries; or cooked in oil.

Granadilla

(*Passiflora*)

The genus *Passiflora* is found in Virginia, North America to South Brazil and Chili, and East Indies. The fruit has a very delicate aroma. The following are the best varieties:—

(1) Granadilla (*Passiflora quadrangularis*), or Square-stalked Passion Fruit : called Maracuja-assu in Brazil ; Parcha Granadina in Venezuela ; also called Barbadine in French Guiana. It has a very fine flavour.

(2) Water Lemon (*P. laurifolia*) : most extensively cultivated in Honolulu, etc., and in the West Indies called Pomme d'Or.

(3) Sweet Cup (*P. maliformis*), of the West Indies :—Apple-fruited Granadilla or Sweet Calabash, and called Maracuja Mamoa in Brazil.

(4) Purple-fruited Granadilla (*P. edulis*) : in Queensland, Passion Fruit ; in Brazil, Maracuja de Suspiro. Green at first, but when ripe has a beautiful plum-colour.

(5) Parchita (*P. lingularis*) :—a Venezuelan variety, and considered one of the finest fruits in existence.

In order that the Granadilla may bear fruit in perfection, the plant requires to be cut back to the main trunk, or stem, every year. When flowering it has a most delicate fragrance, and can be made to trail over an arbour. The fruit pulp is cool, refreshing, with something of a fragrant bouquet.

In Peru, a variety, called Tumbo or Badea, is cut into slices and eaten with sugar and spices.

Lichee Nut

(*Nephelium Litchi*)

In India it is called Litchi ; Kayet-mouk (Burmah) ; and Tan-li or Lichi (China). A native of South China, Cochin-China, and the Philippines, and cultivated largely in India and other parts of the tropics.

The fruit is nearly round, and the edible portion is the sweet jelly-like pulp which covers the seeds. The whole is enclosed in a thin reddish shell, with warty protuberances. The fruit should be eaten as soon as possible after being plucked. It is dried by the Chinese, and then becomes darker in colour, and in this state it is often seen for sale in the London shops. The dried fruit, as sold in Europe, bears no resemblance to the delicious, bitter-sweet pulp when obtained fresh.

Water Melon

(*Cucumis citrullus*)

This well-known fruit is much prized in warm countries, not merely as an article of food, but for quenching thirst and allaying fever.

Jambu

(*Eugenia Jambos*, or *Jambosa vulgaris*)

Called "Jambu" in Samarang, Java, Tahiti, etc.; Cay-dao-annam (Cochin-China); Rose-apple (English); Jambu (Singhalese); Toffah (Arabie); Jambeiro (Brazil); Pom-arosa (Venezuela); Jambu-mera (Sumatra); and Gulab-Jaman (Hindustani). It is a native of the East Indies, and largely cultivated in India, Burmah, and other countries.

The fruit is about the size of an apple, reddish, and smells like rose-water, the pulp being white. It is a most delicious fruit.

Baobab

(*Adansonia digitata*)

A native of tropical Africa, but cultivated in other tropical countries; and called Mowana (Lake Ngami, Africa).

The pulp of the fruit, which has a pleasant subacid flavour, is much esteemed for making a cooling drink. Robinson states that the leaves are used in soup in Haussaland.

Mobola

(*Purinarium mobola*)

A native of tropical Africa, and sometimes called Mola.

The fruit has a strawberry-like flavour.

Anona Senegalensis

A native of tropical Africa. Moloney calls it one of the best native fruits, and resembling an apricot in flavour.

The petals are used to flavour food.

Carambola

(*Averrhoa carambola*)

Believed to be a native of the Moluccas, and introduced into India, Burmah, China, and South America. It is called Zoung-yah (Burmah); Wu-lien-tsze, and Yang-tau (China); and Blimbing-manis (Malay).

The tree bears three times a year, the fruit being as large as a hen's egg, with five acute angles, and yellowish thin smooth rind. Highly prized for curry.

(*Averrhoa bilimbi*)

Called Bilimbi (Hindustani); Pulich-chakkay, etc. (Tamil); Pulusu-kaya-lu, etc. (Telugu); Vilumbikka, etc. (Malay); and Kala-zoun-si, etc. (Burmah).

Jabuti

(*Eugenia cauliflora*)

Called Jabuticaba or Jaboticaburas, and one of the most agreeable fruits of Brazil.

Other good wild fruits of Brazil are Pitanga, Grumixameira, Cambuy, and Uvalha. The Pitanga is called Cerise Carbee in French Guiana.

Asam Gelugur

(*Garcinia atroviridis*)

A native of the East Indian Archipelago, and called Asam Gelurgur (Malay). The fruit is dried in slices for eating with curry.

Langsat

(*Lansium domesticum*)

A native of the East Indian Archipelago, and called Langsat by the Malays. It is a very popular fruit.

CHAPTER IX

BEVERAGES

Cocoa

(*Theobroma cacao*)

THIS tree is a native of tropical America and the West Indies, and develops best in a moist coast climate. It bears fruit from the third to the fourth year, which is not allowed to ripen, however, until the fourth or fifth. The best variety of cocoa is called Cacao de Caracas, which is cultivated in Venezuela, between the rivers Unare and Yaracuy.

The pods are cut from the tree, a small portion of the stalk being left. At the place where the pod is attached there is a soft cushion or eye from which all subsequent flowers and fruits arise, and if this "eye" is damaged by the pod being ruthlessly torn off instead of being cut, the tree, as far as this point is concerned, becomes sterile. By striking one pod against the other, both will break; the beans are then stripped off from the central pulp, and, with the adhering pulp, are left to ferment from four to seven days so as to loosen the pulp, then the pulp and fibrous tissue are removed by hand. After cleaning, the beans (seeds) are spread out on a tray or cloth to dry, and, while drying, are carefully turned so as to be exposed on all sides to the sun.

When well dried the outer skin of the kernel should be hard and crisp, and separate easily from the kernel below. The beans are carefully picked, so as to free them from any which are mouldy or worm-eaten, and then gently roasted in an iron cylinder (over a fire), with holes in the ends to allow the vapour to escape ; when the aroma is well developed this part of the process is complete. Next, the beans are turned out, cooled, and freed from the husks by fanning and sifting. The bean itself is now ready (minus its outer covering) to be crushed in a mortar, or on a smooth heated stone by means of a roller, thus becoming a paste. The Mexicans have a special handmill for this purpose. The flavouring materials, in the form of a fine powder, are now worked in with it ; also the starchy substances and sugar. It is then sprinkled with a few drops of cold water, placed in tin moulds, and left to harden in the air.

When required for use it is ground to a fine powder, and prepared in the usual way with boiling water. Chocolate Asiatico has cocoa-paste, 42 parts ; powdered sugar, 180 ; sweet potato flour, 112 ; rice flour, 64 ; and powdered vanilla or cinnamon, 3. When cocoa is prepared locally it is best to boil it a short time, and, before pouring out, stir until there is a good deal of froth.

The cocoa bean contains 2 per cent. of theobromine, a little volatile oil, and 52 per cent. of fat (butter), etc.

Kola

(*Cola acuminata*)

A native of tropical Africa, the area of growth extending inland 500 to 600 miles. It is called Guru Nut (Western

Soudan); Nangoue (Monbuttoo country); and Kokorokou (Niam Niam country).

Each nut has from five to fifteen seeds. The epidermis or skin of the seed is the principal seat of the colouring matter, and beneath it the seed consists of starchy material, etc., with the caffeine and theobromine. The seeds can be treated like the cocoa bean. When dried they lose their bitterness, giving place to a sweeter flavour.

Kola contains 0.023 per cent. of theobromine, caffeine (theine) 2.34, and a little volatile oil, etc.

Yerba Maté

(*Ilex paraguayensis*, etc.)

A native of Brazil and Paraguay, where it forms woods, called "yerboles."

The leaves are collected, placed in a hide net, and well dried by a fire lighted underneath, care being taken that none are burned. They are next pulverized to a coarse powder by means of a rude wooden mill; then pounded into dust, the whole being afterwards packed in hides. In 1884, 8,000,000 lbs. were consumed in South America, where the beverage made from it is universally used. It is sucked through a tube called a Bombilla.

Yerba Maté contains 1.3 per cent. of theine and a little volatile oil, etc.

Coffee

(*Coffea arabica*)

A native of Abyssinia, East Africa, and cultivated in all tropical countries.

The berries have the outer fleshy part removed, and are left to decay for a short time; they are then dried in a large paved enclosure, and afterwards, by stamping or rolling, the parchment-like inner husks are got rid of; the coffee bean (seed) is then ready to be thoroughly dried in order to make it keep.

When needed it is roasted by means of a coffee-roaster, ground in a coffee-mill, and prepared in the usual way. In Arabia and the East the unroasted bean is constantly used for the preparation of coffee. Pavy states that coffee is said to have been in use in Abyssinia from time immemorial. Coffee contains a little volatile oil and 1.0 per cent. of caffeine (theine), etc.

CHAPTER X

CONDIMENTS

MITCHEL BRUCE * says that "the aromatic volatile oils are in the mouth antiseptic, and also increase the circulation of the blood, exciting the nerves of taste and smell (flavour) powerfully. Several results of the first importance in digestion follow, viz., increase of saliva, reflex increase of blood to the surface of the stomach, stimulation of appetite, increase of relish by pleasing flavour, in a word desire for, enjoyment of, and digestion of food. In the stomach the effect on the vessels and nerves is continued, and here it is generally described as carminative. Besides causing increased flow of gastric juice by stimulation of the mouth, these substances are powerful stomachics in several ways. The blood vessels of the surface of the stomach are dilated and the nerves of the same are first excited, then soothed ; the contents of the stomach, if decomposing as in dyspepsia, are partially disinfected. Their reflex influence is equally important. The muscular coat of the stomach is stimulated, thus increasing gastric movement, expelling flatulence. Thus they are general stimulants. In the intestines they are still found partly unabsorbed, increasing local functions, stimulating intestinal movements, and expelling flatus. They thus

* "Materia Medica," p. 243.

prevent pain or spasm (colic). They enter the blood unchanged, and whilst partly oxydized by the red blood corpuscles, leave the circulation mainly unaltered. They are excreted by the lungs, skin, kidneys, liver, and probably by the bowels. In passing through those structures they stimulate and disinfect them."

As it is now a well-known fact that the microbes of malaria, fevers, etc., exist in the blood, it is quite obvious that if the volatile oils enter the blood chemically unchanged and leave it again mostly in this condition, they will exert their antiseptic influence on the disease germs and kill them. Of course what applies to the oils in their isolated condition will apply to them when still in the bark or seed, etc., used as spices.

Richet * states that "Miquel has experimented with antiseptics in order to see which are the *most powerful*." The result has been to show that bichloride of mercury, etc., are the most powerful; *volatile oils* and hydrocyanic acid (prussic acid) are placed in the next class; carbolic, oxalic, tartaric, and citric acids in the third class; boracic acid and *hydrobromide of quinine* in the 4th class.

Foster (U.S.A.) † states that "Cadeac and Meunier have experimented with about ten volatile oils in order to ascertain the *length of time* required to kill the microbes of typhoid fever. The only spice oils tried were oil of cinnamon and oil of cloves. These beat all the others in the rapidity with which they killed the microbes." The microbes of malarial fever, cholera, and tropical dysentery, so far as I know, have not been experimented with. All

* "Dictionnaire de Physiologie," 1897, vol. i., p. 608.

† "Practical Therapeutics," vol. i., p. 448, under "Germicides."

microbes of the class referred to belong to the lowest forms of animal life, viz. the Protozoa—and probably antiseptics act similarly on all.

The malarial microbe is very easily killed outside the body; in fact, there is a difficulty in keeping it alive. So that it would appear as if the volatile oils could easily kill the microbe in the body.

The most recent researches in medicine show that the three principal diseases in India are fever, cholera, and tropical dysentery. In all these complaints the microbes are present in the corpuscles of the blood, and have entered the body by the lungs, with the food and water, or, as recently proved by Major Ross (Director of the School of Tropical Diseases, Liverpool), by the bites of mosquitoes. Allbutt* states that these microbes are the “immediate cause” of the disease. Quinine, as Mitchell Bruce† and Bartholow (U.S.A.)‡ inform us, acts “*as an antiseptic*, and kills the microbe.” This drug constitutes the usual medical treatment of malarial fever, but no one has ever realized the great value of the *spices*, which act as a constant preventive to the above diseases by killing the microbes if they enter by the lungs, mouth, or skin.

Bartholow (U.S.A.)§ states “there is a distinct relation between the antiseptic and antipyretic properties of various members of the group of antiseptics as they have the power to depress temperature in the same ratio as they are active in *destroying* disease germs or ferments.”

* “System of Medicine,” 1897, vol. ii., p. 309.

† “Materia Medica,” p. 265.

‡ “Materia Medica,” p. 203.

§ “Materia Medica,” 1896, p. 366.

Thayer (U.S.A.) * records that in intermittent fever the paroxysm always follows the segmentation (increase) of a group of microbes.

G. F. Butler (U.S.A.) † says that "the aromatics (spices) are powerful antiseptics, and possess properties very similar to the more typical antiseptics." He also goes on to state that "during the cholera in Paris and London, perfumers were immune," and also that "when the Dutch destroyed the clove tree in one of their East Indian colonies it suffered from epidemics and disorders unknown before."

Peron ‡ says that he "was convinced that he preserved his health during a long and difficult voyage by habitual use of Betel; while his companions, who did not use it, died mostly of dysentery."

Bancroft states || "it is a general mistake that spices are detrimental, whereas nothing is more productive of health, and we find Nature provides and has taught the inhabitants their use. They season their food with a great quantity of pepper (chillies). By this practice the Indians wholly preserve themselves from intermittent fevers which are endemic to the other inhabitants of Guiana who do not imitate them."

Each country has its compounds or combinations. Malagueta pepper with baobab leaves (West Africa); pan, which consists of betel pepper leaves, etc. (tropical Asia); cassareep, which consists of concentrated manioc juice with well-known spices (tropical America and West Indies);

* "Malarial Fever," 1897, p. 245.

† "Text-book of Materia Medica," 1896, sect. "Aromatics."

‡ "Voyage aux Terres Australes."

|| "Natural History of Guiana."

and pepperpot, which has eassareep, ehillies, etc. (tropical America and West Indies). This is called "arube" or "tueupi" in Brazil. Curry powder contains green ginger, dried ehillies, stiek einnamon, cloves, nutmeg, mace, turmeric, eardamom, lemon-grass (Serraye, in Sumatra), with lime juice, tamarind, mango, and salt.

Many Europeans are under the impression that "curry" and rice means curry powder and rice. This is not so. Curry means fish, beans, or peas with vegetables, spices, and salt, which are eaten with rice boiled separately. So curry and rice are equal to the European course of meat, vegetables, potato, salt, and pepper.

The ingredients of "ehutney" are green ginger, chillies, tamarind, mango, lime juice, sugar, and salt.

The active principle in the following condiments is an essential or volatile oil.

Capsicum, or Chilli

There are two principal kinds of the genus *Capsicum*: the larger, with fruit the length of a man's fore-finger, usually termed capsicum; and the smaller, with fruit about $1\frac{1}{2}$ inches in length, usually called ehilli (pepper).

There are three varieties most commonly cultivated in tropical countries:—

(1) *C. annum*, called Mattisa in Hindustani, and in Brazil called Quija, or Quiya, or Pimentao. When green this chilli is used for pickling, and when ripe it is mixed with tomatoes, etc., to make sauees; it is also dried and ground into cayenne pepper. The consumption of this variety is very great in hot countries, as it is the principal

ingredient in all curries and chutney. Ground into a paste between stones, with a little oil, ginger, and salt, it is good seasoning for rice and various dishes.

(2) Goat Pepper, called Lal Mirich in Hindustani and Pimenta de Cumari in Brazil. In India it is the commonest and largest species, and when ripe the pod is bright red. When picked it is laid out on mats to dry in the sun, and is an indispensable ingredient in curry. Both green and ripe it is much used for pickles. By pouring hot vinegar on the fruit all the essential qualities are procured, and this liquid which is called "chilli vinegar," is used for flavouring. The pods are often dried on hot plates or in a slow oven, pounded in a mortar, then passed through a hand mill till finely powdered, well sifted, and preserved in a corked glass bottle for use. In Jamaica, salt and pepper are ground into it, and it is then called "cayenne butter."

(3) Bird's-eye Chilli or Pepper, called Pimenta Malagueta in Brazil. This small chilli is not so much in request as those already mentioned; it is principally used for making chilli vinegar; and, mixed with salt, is employed for seasoning. Chillies are often fried in oil, and eaten with beans, fish, etc.

Cinnamon

(*Cinnamomum Zeylanicum*)

This tree is a native of the mountain forest districts of Ceylon, etc., up to 3,000 feet. It is called Canella de Ceylon in Brazil; Kaiamanis or Kuletmanis in Malay. When under cultivation, the young bushes are pruned, so as to prevent the formation of trees and to cause them

to produce stalks, from which four or five shoots are allowed to grow. These shoots are in perfection at from eighteen months to two years, when they begin to turn brown on their surface. During the dry season they are cut off by means of a long sickle-shaped knife, and the leaves stripped off. The bark of these shoots is cut through transversely, at a distance of one foot, and two opposite longitudinal incisions are made to connect the transverse; and finally the bark is removed by introducing the peeling knife beneath it. The pieces of bark are then placed one within the other, bound together in bundles, and left for twenty-four hours. The two external layers of bark are then carefully removed by scraping, for which purpose each quill is placed on a piece of wood of the required thickness. The bark is kept one day in the shade, after which it is placed on wicker trays, dried in the sun, and finally packed in bundles.

This spice is used generally for purposes of flavouring; also for making curry powder.

The following are varieties :—

Cinnamon (*C. iners*) called Jangli-darchini (Hindustani); and Sikiyabo, etc. (Burmah). The bark and leaves are used in curry.

Cinnamon (*C. obtusifolium*): called Patichanda (Assam). The dried leaves (which are aromatic) are used as a spice, and in curry.

Cassia lignea (*C. Tamala*): called Dalchini, etc., (Hindustani); Thit-kya-bo (Burmah). The leaves are commonly used as a condiment. The cassia buds (unexpanded flower-heads) have properties similar to the bark, and are used as spices. Cassia bark is used for flavouring dishes.

Wild Cinnamon

(*Canella alba*)

A native of tropical America. It is called Casca Paratudo in Brazil. The bark is commonly used as a spice in the West Indies, Islands of the Antilles, etc.

Turmeric

(*Curcuma longa*)

This plant is called Haldi (Hindustani); Kurkum (Arabia); Manjal (Tamil); Pasupu (Telegu); Mannal, etc. (Malay); Sanoe, etc. (Burmah); Nge or Kuong-huynh (Cochin-China); Mandjano (Kisuah, East Africa); and Tamotamo (Madagascar).

The roots are boiled, and then sundried. It is universally used as a condiment in curries, and gives the yellow colour to curry powder. Watt says it is one of the indispensable ingredients in curries.

Gloves

(*Caryophyllus aromaticus*)

The tree from which cloves are obtained is a native of the Moluccas, etc., and is generally cultivated in the tropics. It prefers volcanic soil, an elevation of from 300 to 1,000 feet above sea level, and begins to bear at the sixth year. It has a very slight hold on the soil, and therefore requires shelter from strong winds. In Brazil the

Cravo do Maranham or Cucheri of the Indians yields cloves especially in the provinces of Para and Solimoes.

The unexpanded flower-buds are gathered by hand when bright red, and then dried, causing them to turn a brown colour. In Sumatra they are dried by simple exposure to the sun for several days; elsewhere they are occasionally smoked on hurdles covered with netting, near a slow wood fire, and are ready for keeping when they break easily between the fingers. The clove is richer than any other spice in essential (or volatile) oil, of which there is from 16 to 20 per cent. Like cinnamon, cloves are used for flavouring, and are added to stewed fruits and jams.

Cardamom

(*Elettaria cardamomum*)

This plant is called Choti-clachi in Hindustani; Pooah Lako (Sumatra); Ellakay, etc. (Tamil and Telegu); Panlat, etc. (Burmah); Capulaga, etc. (Malay); Eleki (Kisuah, East Africa); and Cardamomo (Brazil). It is a native of West and South India, in the moist forests of the mountainous tracts of Mysore, etc.

The fruit is picked off, and spread out for four days on mats which during the day are supported on four sticks and exposed to the sun, and at night taken into the house. The scapes are stripped off, and the drying completed by a gentle fire heat. In Coorg, India, the fruit is stripped from the scape before drying, and

the drying sometimes wholly effected by sun heat. This is the most valuable of all the Indian condiments, and is extensively used for flavouring sweetmeats and certain cooked dishes; the natives also chew it with betel leaves. In Cochin-China cardamoms are often chewed after meals.

East African Cardamom

(*Amomum*)

This Cardamom is called Matungula (Kisuh); Matunguru (Uganda and French Unyoro); Longozy (East coast of Madagascar); Korarima (Galla); Guragié Spice; Kheil (Arabia); and Oggieh (S. Abyssinia).

In north-east tropical Africa the inhabitants use the crushed seeds to mix with coffee, just as the Egyptians use "Habbe-han," which are Abyssinian seeds of the same plant. The aromatic pulp surrounding the seeds (cardamoms) is much eaten.

Melegueta Pepper

(*Amomum Melegueta*)

A native of west tropical Africa, and sometimes called Guinea Grains (English); and Habselia (Niam Niam).

It is esteemed as a most wholesome spice, and generally used to season food in West Africa. The aromatic pulp surrounding the seeds (pepper) is much eaten.

West African Pepper

(*Piper clusii*)

This plant is widely distributed in tropical Africa, and is called Irrei (Yoruba); also Tara (West Africa). In some parts it is called Dojvie.

In West Africa it is largely used to flavour soups and other dishes. The plant has bright red berries, and generally grows in mountainous country as a climber on moderate-sized trees in forest thickets.

Betel Leaves

(*Piper betle*)

This Betel is probably a native of Java, but is much cultivated in the hot and damp regions of the tropics. It is called Pan (Hindustani); Vettilai (Tamil); Kun-yoe, etc. (Burmah); Vettila (Malay); and Siri (Java and Sumatra). It is a perennial creeper.

The leaves contain an alkaloid called "arakene," also an aromatic volatile oil, which is only active when they are green; when dry, they wholly lose the oil, and with it all their valuable properties. They are masticated by the inhabitants of South Asia when combined with cardamoms, nutmegs, cloves, and other spices. Some natives also use areca-nut, but this would seem to be objectionable, as it has the effect of colouring the teeth black. When areca-nut is used, a little lime also is

added. For further information, consult "Economic Products of India," by George Watt, vol. vi., 247, and vol. i., p. 291.

In Java, the Dutch physicians have come to the conclusion that the chewing of betel leaves promotes health in the damp and miasmatic climate of that country. The Netherlands Indian Government has accordingly enjoined that the leaves be served out to invalids with a view to reducing sickness. The chewing of betel leaves is supposed to prevent dysentery.

Pimento

(*Eugenia Pimenta*)

A native of West Indies, Central America, and tropical South America. The bruised berries are carminative, stimulating the stomach, promoting digestion, and relieving flatulence.

The fruit of *Eugenia caryophyllus* is used in the same way in Brazil; and of *Myrtus Tabasco* in Cumana, South America.

Ravintsara

(*Agathophyllum aromaticum*)

This spice is sometimes called Clove Nutmeg, and is a native of Madagascar and Mauritius.

The leaves are used as a condiment, and Grant says that the aromatic volatile oil from its leaves is preferred by the cooks of India to any other.

Nutmeg

(*Myristica fragrans*)

This tree is a native of the Moluccas, etc., and is largely cultivated. The fruit ripens during the rains, being about the size of a large plum, with a green covering. It bears all the year round, but most abundantly every second year. It is monœcious as well as dioecious, but you cannot tell which until it flowers and fruits at the seventh year.

Nutmeg and mace are largely used as condiments. The mace is a kind of fibrous network which covers the nutmeg, or seed.

Ginger

(*Zingiber officinale*)

This well-known product is cultivated in all tropical countries.

About the middle of winter the roots are ready to take up, when, having been well washed and dried, they may be stored away. It is called "White ginger" when it has been dried in the sun, washed, and scraped; and "black ginger" when it has not been scraped.

To make preserved ginger the tubers should be taken up when very young and tender, the plants being then about five to six inches high. Scald the tubers, wash in cold water, and peel. Make a syrup (1 lb. of sugar to 1 lb. of water), into which stir gradually the beaten whites of two eggs, then boil and skim well; when quite cold, pour it over the ginger, cover it, and let it remain from two to three days. Boil the syrup again, and, when cold, pour it

over the ginger a second time. Proceed till the syrup has thoroughly penetrated the ginger, which you may ascertain by its taste and appearance. If the syrup, when hot, is poured upon ginger it will shrink and shrivel.

Vanilla

(*Vanilla planifolia*, etc.)

A native of tropical America, where it is found growing wild in the shaded warm ravines of damp mountainous forests. Fertilization is carried out naturally by insects in its wild state, but under cultivation requires to be done artificially. The plants are cultivated by placing the roots on trees which have a soft bark, to which they cling and absorb nourishment therefrom.

The fruit is a long pod, which contains amongst its constituents a volatile oil and a considerable quantity of benzoic acid. A few ounces will flavour 1 cwt. of chocolate. Gather when yellow, and after a slight fermentation lay out in the sun to dry. When about half-dried, rub with mahogany-nut oil; and after again exposing to the sun, apply more oil, and expose in the sun for several days till properly dried. Bentley and Trimmen say "the fruits (pods) are collected before they are quite ripe, when their green colour begins to disappear. They are then dried in the shade, and afterwards covered with a coating of oil.

CHAPTER XI

PRODUCTS NOT ANALYZED

North African Doum Palm

(Hyphæne Thebaica)

A NATIVE of north tropical Africa and South Arabia. It is called Gingerbread Tree (English) ; Kerzim (Bornou) ; Kolongo (Bagirmi) ; Goreba (north of Kano) ; and Farobier (Senegal).

Seeman says that the fruit is much larger than the date, and equally nutritious. The spongy internal part of the fruit is an important article of food, and when mixed with an infusion of dates constitutes a cooling drink. The rind is thick and mealy, containing a bitter but not disagreeable juice. Baker says that "the fruit is pounded between two stones, and the edible part detached. This is eaten raw, or boiled into a delicious porridge with milk. It has a strong flavour like gingerbread.

"The leaves are used for thatching, mats, etc.; and for the best kind of hats."

Manpatas

(*Parinarium excelsum*)

A native of tropical Africa, and called Gray or Rough Skinned Plum of Sierra Leone ; and Manpatas in Senegal.

Moloney says that the fruits are farinaceous and much esteemed for eating. *Parinarium curatellæfolium* has a fruit the size of a plum, mealy, and Barter says it is one of the best fruits on the Niger.

Peachnut

(*Guilielma speciosa*)

The Piritu or Pirijao of Venezuela, Pupunha of the Amazon District, Paripou of French Guiana, and Guachi-paens of New Granada.

It is cultivated extensively at San Fernando, San Baltasar, Santa Barbara, Atabopo River, Upper Orinoco River, and Amazon River District in Brasil. The fruit is triangular, oval, and reddish yellow. The tree is so prickly that it is impossible to climb it, so rough ladders are placed against it, and the fruit pulled off with hooked poles.

The fruit is eaten boiled with salt ; or roasted ; also ground into flour, made into cakes, and roasted like cassava bread. The natives depend as much upon it as on the cassava and plantain for food. Sagot says it should be cultivated in all tropical countries.

APPENDICES

APPENDIX I

PERCENTAGE COMPOSITION OF SOME ARTICLES OF FOOD OF THE
TEMPERATE ZONE.

| Name. | Water. | Proteids. | Oil or Fat. | Starch. | Sugar. | Fibre. | Mineral Salts. | Remarks. Analyst, etc. |
|-----------------------------|--------|-----------|-------------|---------|--------|--------|-------------------|--|
| BREAD : | | | | | | | | |
| Wheat | 14·5 | 11·0 | 1·2 | 69·0 | — | 2·6 | 1·7 | Church |
| POTATO : | | | | | | | | |
| Potato | 75·0 | 2·3 | 0·3 | 15·4 | — | 1·0 | 1·0 | Church (Dex- trin and Pec- tose 1·5, and Extractives) |
| MEAT : | | | | | | | | |
| Lean beef ... | 72·0 | 19·3 | 3·6 | — | — | — | 5·1 | Pavy |
| BUTTER : | | | | | | | | |
| Butter (from cow's milk) | 10·0 | 1·0 | 87·7 | — | 0·3 | — | 1·0 | Church |

PERCENTAGE COMPOSITION OF SOME ARTICLES OF FOOD OF THE
TROPICAL ZONE.

| Name. | Water. | Proteids. | Oil or Fat. | Starch. | Sugar. | Fibre (Cellulose) | Mineral Salts. | Remarks. Analyst, etc. |
|--------------------------------|-------------|-----------|-------------|-------------|--------|----------------------|-------------------|---|
| BREAD : | | | | | | | | |
| Great millet ... | 12.5 | 9.3 | 2.0 | 72.3 | — | 2.2 | 1.7 | Church |
| Bulrush millet ... | 11.3 | 10.4 | 3.3 | 71.5 | — | 1.5 | 2.0 | " |
| Ragi ... | 12.5 | 5.9 | 0.8 | 74.6 | — | 3.6 | 2.6 | " (whole grain) |
| Maize ... | 12.5 | 9.5 | 3.6 | 70.7 | — | 2.0 | 1.7 | " |
| Manioc ... | 12.81 | 12.78 | 2.0 | 68.19 | — | 2.27 | 1.93 | Peckolt |
| Rice ... | 12.8 | 7.3 | 0.6 | 78.3 | — | 0.4 | 0.6 | Church |
| Unripe plantain (flour) | 8.05 | 6.7 | 0.7 | 82.57 | — | — | 1.8 | Blyth |
| Breadfruit flour | 18.55 | 1.73 | — | 74.04 | — | 3.23 | 8.45 | Sagot |
| Commercial sago | — | — | — | 83.0 | — | — | — | Church |
| POTATO : | | | | | | | | |
| Sweet cassava ... | 55 to 72 | — | — | 13 to 28 | 2.4 | 5.9 | — | Peckolt |
| Taro ... | 82.5 | 1.8 | 0.2 | 14.0 | — | 0.6 | 0.9 | Wohltmann |
| Sweet potato ... | 75.0 | 1.5 | 0.4 | 15.0 | 1.7 | 1.8 | 1.5 | Church. (Dex- trin and Gum 2.2, Pectose 0.9) |
| Yam ... | 79.6 | 2.2 | 0.5 | 15.3 | — | 0.9 | 1.3 | Church |
| MEAT : | | | | | | | | |
| Kingfish (edible part) | 79.2 | 18.7 | 0.9 | — | — | — | 1.2 | Atwater and Woods, U.S.A. |
| Shad (edible part) | 70.6 | 18.6 | 9.5 | — | — | — | 1.3 | " " |
| Turtle, Green (edible part) | 79.8 | 18.5 | 0.5 | — | — | — | 1.2 | " " |
| Soy bean ... | 11.0 | 35.3 | 18.9 | — | — | 4.2 | 4.6 | Church. (Starch and sugar 26.0) |
| Green gram ... | 10.8 | 22.2 | 2.7 | 54.1 | — | 5.8 | 4.4 | „ (with husk) |
| Black gram ... | 10.1 | 22.7 | 2.2 | 55.8 | — | 4.8 | 4.4 | " " |
| Groundnut ... | 7.5 | 24.5 | 50.0 | 11.7 | — | 4.5 | 1.8 | " " |
| Moth bean ... | 11.2 | 23.8 | 0.6 | 56.6 | — | 4.2 | 3.6 | " " |
| Lima bean ... | 13.3 | 19.7 | 1.2 | 57.8 | — | 4.3 | 3.7 | " " |
| Catjang bean ... | 12.7 | 23.1 | 1.1 | 55.3 | — | 4.2 | 3.6 | „ (with husk) |
| Cajan pea, or Red gram | 13.3 | 17.1 | 2.6 | 55.7 | — | 7.5 | 3.8 | " " |

| Name. | Water. | Proteids. | Oil or Fat. | Starch. | Sugar. | Fibre (Cellulose) | Mineral Salts. | Remarks. Analyst, etc. |
|-------------------------------------|--------|-----------|-------------|---------------------------|--------|----------------------|-------------------|-------------------------------------|
| BUTTER : | | | | | | | | |
| Soybean ... | — | — | 18·9 | — | — | — | — | Church |
| Tilor Beni (seeds) | — | — | 45 to 50 | — | — | — | — | <i>Spons' Encyclo- pedia</i> |
| Groundnut ... | — | — | 40 to 50 | — | — | — | — | Watt, George |
| Juvia (nut) ... | — | — | 56·0 | — | — | — | — | <i>Chamber's En- cyclopedia</i> |
| <i>Pulp</i> of fruit of Oil Palm | — | — | 72·0 | — | — | — | — | — |
| Dika (kernel of stone of fruit) | 5·0 | 9·5 | 73·0 | 7·2 | — | 3·0 | 2·3 | Church |
| Cocoa bean ... | — | — | 52·0 | — | — | — | — | Payen |
| Ripe coco-nut ... | 46·6 | 5·5 | 35·9 | — | 8·10 | 2·9 | 1·0 | Church. (Solid white kernel) |
| Coco-nut (unripe) | 90·0 | — | 2·29 | — | 0·43 | — | — | Semler |
| SUGAR : | | | | | | | | |
| Sugar-cane juice | — | — | — | — | 18·20 | — | — | <i>Spons' Encyclo- pedia</i> |
| Ripe banana ... | 73·9 | 4·8 | 0·6 | 19·7 (Sugar & Pectose) | — | 0·2 | 0·8 | Church |

APPENDIX II

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APPENDIX III

FISHES

THE following list gives the names of some of the best edible fishes of the tropics, and their habitat.

NOTE.—The Latin and English names are given where possible.

WEST INDIES.

Caranx Bartholomei.—Green Cavalla. Barbadoes.

Eleotris guavina.—Loche. Fresh-water fish. Guadaloupe.

Eleotris gyrrinus.—Tetard. Fresh-water fish. Guadaloupe.

Engraulis edentatus.—Anchovy or Silver-fish. Jamacia.

Gobius martinicus.—Pacou. Split, salted, dried, and when cured is highly prized.

Lobotes auctorum.—Atlantic coast-line of tropical America.

Monacanthus tomentosus.—Horned Coney-fish.

Mesoprion cynodon.—Yellowtail Schnapper.

Philypirus dormitator.—Dormeur. Guadaloupe.

Rhombus ocellatus.—Flounder, or Plaice.

Upeneus martinicus.—Queen Mullet.

Aigrette. Windward Islands.

Angel-fish. Also at Bahia and coast of Mexico.

Chuck.

Cutlass.

Hogfish.

Kingfish.

„ (Young) called Coramour. Is a great delicacy.

Morocoto or Osibu.

Mullet.

Schnapper (Black).

„ (Gray)

Smook.

Sprats.

tone Bass.

SOUTH AMERICA.

Arapaima gigas.—Rivers of Brazil.

Caranx guarapucu.—Cavalho. Bahia.

„ *pisquetus*.—Solteira (Bahia). Also common at Rio de Janeiro.

Coryphæna sueirei.

Cybium regale.—Sororoca. Bahia.

Cycla toucounarai.—In the Lake of Pearles, province of Goyaz, Tocantins, Amazon River. Called Toucounarai; but by the Chambioas of Araguay, it is known as Kini-teray.

Hemiramphus brasiliensis.—Agulha-creola. Bahia. Also common at Rio de Janeiro.

Johnius crouvina.—Crouvina. Crixas River, and Araguay River.

Mesoprion chrysurus.—Rababeta. Bahia.

Mugil liza.—Mullet. Rio de Janeiro.

Osteoglossum minus.—Aronana. Tocantins, and Amazon River.

Pigocentrus piraya.—Piranha. Goyaz, Brazil.

Pomacentrus variabilis.—Maria-Molle. Bahia.

Pristipoma acarapinima.—Freade (Bahia).

Salminus hilarii.—Rabo Vermelho. Rio Vermelho, Brazil.

Serriola cosmopolita.—Garapas. Bahia.

Vastres gigas.—Pirarucu. Amazon River. Often salted.

Burton, in his book entitled "Highlands of Brazil," mentions Piau-branco, Curimata (*Anodus amazonum*), Loango, Dourado, and Cacunete, as good edible fishes.

SOUTH AND EAST ASIA.

Anabas scandens.—Climbing Fish; Sennal (Tamil); Undi-colli (Malay). A fresh-water fish of India, Ceylon and Burmah.

The boatmen on the river Ganges carry them in moist earthen pots, killing and cooking them as required.

Arius gagora.—Gagora (Bengali); Nga-youn (Burmah). In seas and tidal rivers, Orissa and Bengal to Siam.

Callichrous malabaricus.—Mungi-wahlah (Malay). A sea fish.

Carcharias acutus.—Parl-sorrah (Malay). A sea fish.

Catla Buchanani.—Nga-thaing (Burmah). Burmah to Siam.

Chatoessus nasus.—Nunah (Malay). Sea fish.

Chrysophrys berda.—Ari (Malay); Black Rockfish or Black Rockcod. Seas of India to Malay Archipelago and beyond.

Clarias magur.—Nga-khu (Burmah). Extensively salted in Burmah; also found in the Malay Archipelago. A fresh-water fish.

Clupea fimbriata.—Cuttay-charlay (Malay). Red Sea and seas of India. Extensively used as food, and in the preparation of fish oil.

Clupea ilisha.—Shadfish, Sable-fish, or Hilsa. Ikan-truboh (Malay); Persian Gulf and coasts of India and Burmah; passing up large rivers to breed. Excellent till they have deposited their ova.

Cybiium commersonii.—Seirfish; Chambam (Malay). Best quality when only $1\frac{1}{2}$ to $2\frac{1}{2}$ feet in length. Found also at Zanzibar, East Africa, and through Indian seas, etc.

Cybiium lineolatum.—Seirfish; Barim-kutti (Malay). A sea fish.

Cynoglossus lingua.—Ikan-ledah (Malays); the Sole (English).

Drepane punctata.—Pundthi (Malay). East coast of Africa, Red Sea, Indian Ocean, to North-West Australia.

Dussumieria actua.—Kurie (Malay).

Engraulis indicus.—Bunga-ayer or Budah (Malays).

Harpodon nehereus.—Bombay Duck (Bengal); Bummelo (Malay); Sea-fish. Eaten fresh and salted.

Hemiramphus cantori.—Toda-pendek (Malay); Guard-fish (English). Sea fish. It is called Guardfish at the Straits Settlements.

Labeo rohita.—Rohu. Fresh-water fish. Irrawady and Sittoring rivers, etc., Burmah.

Lates calcarifer.—Nuddi-min or Nair-min (Malay). Used in the preparation of Tamarind-fish.

Lutjanus jahngarah.—Extensively cured by drying.

Mugil Corsula.—Mullet. Rivers of Burmah, India, East Indian Archipelago, Persian Gulf, Red Sea, etc. The salted Roe is considered a great delicacy.

Mugil cunnesius.—Mahlah (Malay). Sea fish.

Ophio cephalus marulius.—Choari-verarl or Curavu (Malay). A river fish.

Osphromenus olfax.—The Gourami of the East Indian Archipelago, Cochin-China, etc. The Dutch in Batavia rear this fish in earthen vessels, renew the water every day, and feed it with nothing but fresh-water plants. It has been introduced into Cayenne, South America, French West Indian islands, and Mauritius.

Polynemus indicus.—Ycta (Malay). Sea fish. The Rowball of Europeans at Vizagapatam, and Malay Peninsula.

Polynemus paradiseus.—Mango-fish; Nga-pungna (Burmah); Tosi-mutchi (Bengal).

Pristis cuspidatus.—Sawfish. Sea fish, but ascending rivers.

Rita Buchanani.—A river fish.

Serranus diacanthus.—Killi-min (Malay).

„ *lanceolatus*.—Kurrupu (Malay).

„ *Shihpan*.—Shippan (Macao, China).

Stromateus niger.—Black Pomfret; Kar-arwuli (Malay). Also found at Bagamoia, East Africa. Extensively salted, as well as eaten fresh.

Stromateus argenteus.—Stan-gyu (Chinese).

„ *sinensis*.—White Pomfret; Vella-arwuli (Malay). Sea fish. Cook when quite fresh. It is also extensively salted.

Trichogaster fasciatus.—In sea and river. Extensively dried, and in Burmah made into “nga-pi.”

Upeneoides vittatus.—Chirul (Malay). Red Sea and Indian seas.

SOUTH PACIFIC, AND QUEENSLAND, AUSTRALIA.

Belone Kreffti.—Fitzroy Gar-pike.

Caranx gallus.—Diamond-fish. Also found at Aden, East Africa.

Chanos salmoneus.—Also found in the Malay Archipelago.

Chatoessus elongatus.—Bony Bream.

Chrysophrys australis.

„ *axillaris*.—Jewfish.

„ *hasta*.

Clupea hypselosoma.—A Queensland Herring.

„ *sundaica*.—Plentiful at Torres Straits.

Cossyphus aurifer.

„ *latro*.

Cybirum commersoni.—The Seirfish of India.

Dentex filifer.—Long-tailed Perch.

Drepane punctata.—Chonghu (Chinese). Spotted Dorey.

Engraulis nasutus.—The food called “redfish,” or “ikan-merah” (Malay), is made from this fish.

Genyoroche amabilis.—The Hussar.

„ *regia*.—Queenfish.

Hemirhamphus argenteus.—Snub-nosed Garfish.

Lates calcarifer.—Queensland Perch.

Lobotes auctorum.—Queensland Dusky Perch.

Lethrinus chrysostomus.

Megalops cyprinoides.—Giant Herring.

Mesoprion superbis.—Red Bass.

Mugil.—Mullet.

Mugil waigiensis.—Northern Mullet.

Murænesox cinereus.—Pike Eel.

Nereis.—The delicacy known as “Palolo,” is a small marine worm, which, at a certain time of the year appears in vast shoals on the surface of the sea near Samoa, Tonga, Fiji, and other Pacific Islands. It is regarded as one of the daintiest luxuries of the Pacific. They are tied up in bread-fruit leaves and baked.

Osteoglossum Leichhardti.—The Barramunda. Fresh-water fish.

Platax orbicularis.—Silver Dorey. Also found at the Admiralty Islands.

Polynemus Sheridanii.—Mary River or Burnett River Kingfish. One of the “Tassel-fishes.”

Polynemus tetradactylus.—Cooktown salmon, or Bynni Carp.

Pristipoma hasta.—Javelin-fish, or Queensland Trumpeter.

Psettodes erumei.—Also found on the east coast of Africa, East Indian Seas, and the Andamans.

Pseudocarus rivulatus.—Parrot-fish.

Rhinobatus granulatus.—Shovel-nosed Skate. Also found at the Andamans.

Sillago ciliata.—Sand Whiting.

Spratteloides delicatulus.—One of the fishes used in the preparation of "red-fish" in the Island of Celebes, East Indian Archipelago.

Stromateus niger.—Blue Skate. Also found on the east coast of Africa, East Indian Seas, and the Andamans.

Synagris tæniopterus.—Gold Perch.

Synancidium horridum.—Stone-fish.

APPENDIX IV

TROPICAL SEED MERCHANTS

J. P. William & Brothers, Henaratgoda. Ceylon.

Vilmorin-Andrieux & Cie., 4 Quai de la Mégisserie. Paris.

1 BEX.03
1904



11/1/19

